Anderson Paper
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Ohio's Agriculture Tomorrow

A graphic summary of the past and appraisal of future prospects

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Introduction and Outline

This mainly graphic report on the past and future of Ohio's agriculture is divided into five sections:

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3. The changing structure of agriculture
   Figures 13-14
4. The challenge of rejuvenating the livestock industry--emphasizing swine.
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The main conclusion of this study is that Ohio is losing competitive advantage in some crop enterprises but especially in livestock production with the notable exception of poultry and eggs.

Catching up will require a willingness to address the state's receptiveness to large scale livestock operations--traditional small family farms will continue to drop livestock enterprises. The people of Ohio will decide whether to accept a future that continues current trends or to encourage livestock operations that expand value added, jobs, and income from agriculture. Policies for agriculture that would help to expand market share include a predictable, competent, and fairly enforced regulatory framework, agricultural research and extension, and public information.

1. Crops

Figures 1 to 4 present trends in four major Ohio crops - - corn, soybeans, wheat, and hay. Key conclusions are:

- Yield and production of all crops have trended upward while acreage has held fairly steady on average (Figures 1a-4a). Exceptions are acreage of soybeans which has trended upward and of hay which has trended downward.

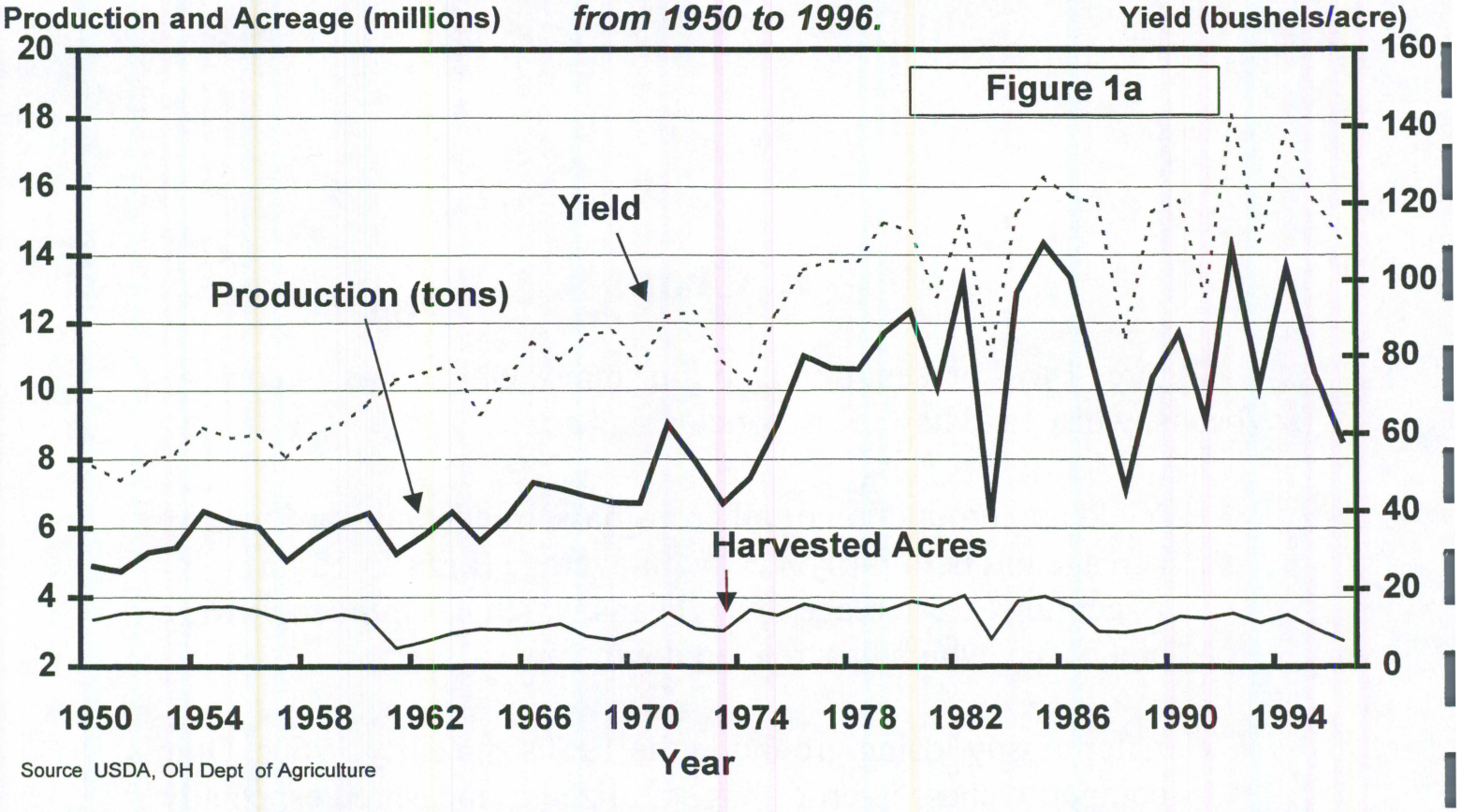
- After mostly losing ground in the 1950s and early 1960s, Ohio's competitiveness in crops has stabilized as measured especially by Ohio yields as a percent of U.S. yields (Figures 1b-4b).

- The number of farms producing individual crops has declined as the total number of farms in Ohio has declined (Figures 1c-4c).

- The number of farms in Ohio fell from 199,359 in 1950 to 72,000 in 1996, a 64 percent decline averaging 2.2 percent per year. Meanwhile, the proportions of farms producing soybeans and hay increased while proportions of farms producing corn and wheat decreased (Figures 1c-4c).

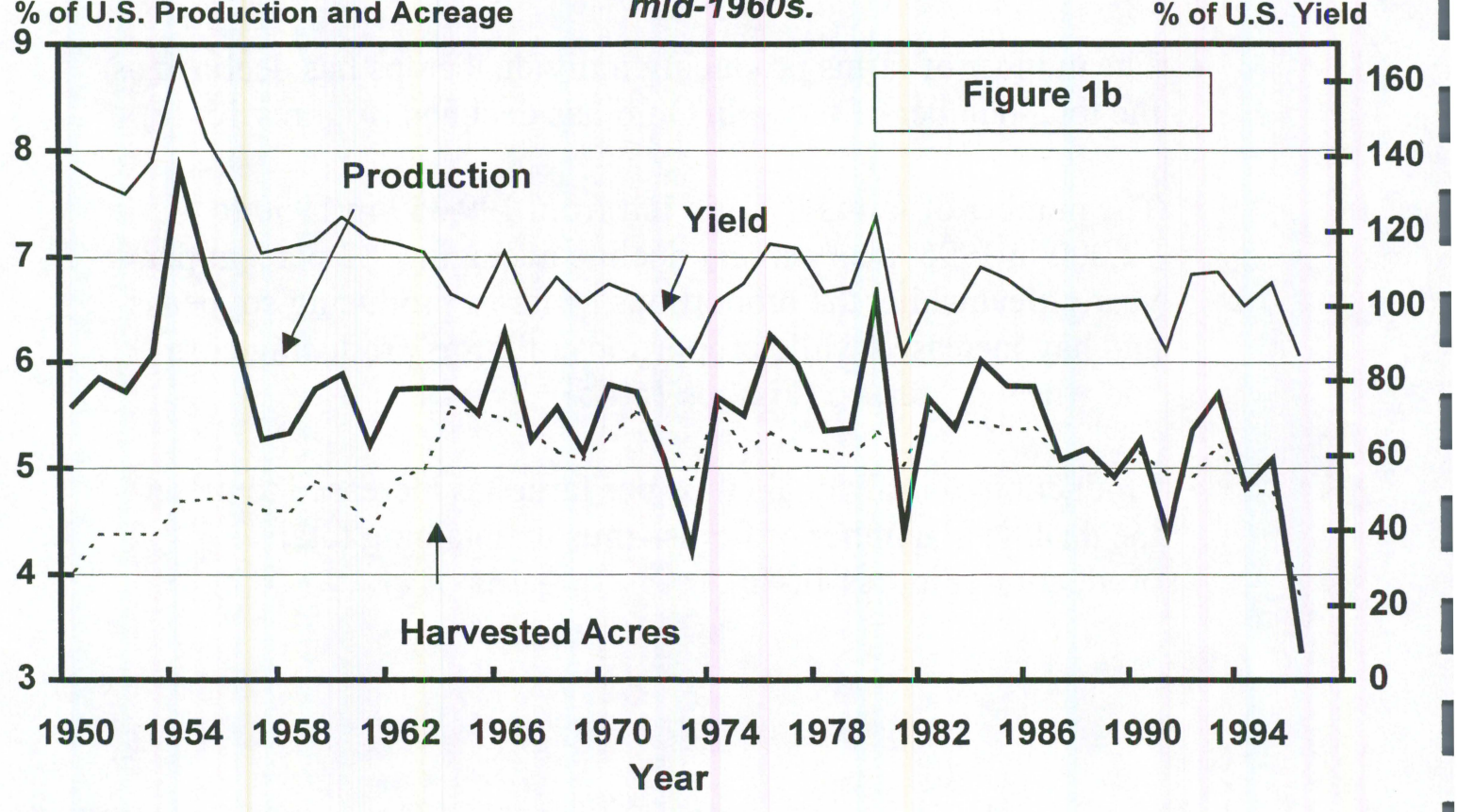
- Production of individual crops per farm has increased to offset the decline in number of farms--thus maintaining total production (Figures 1c-4c).

Ohio corn acreage flat but production and yield trend upward from 1950 to 1996.



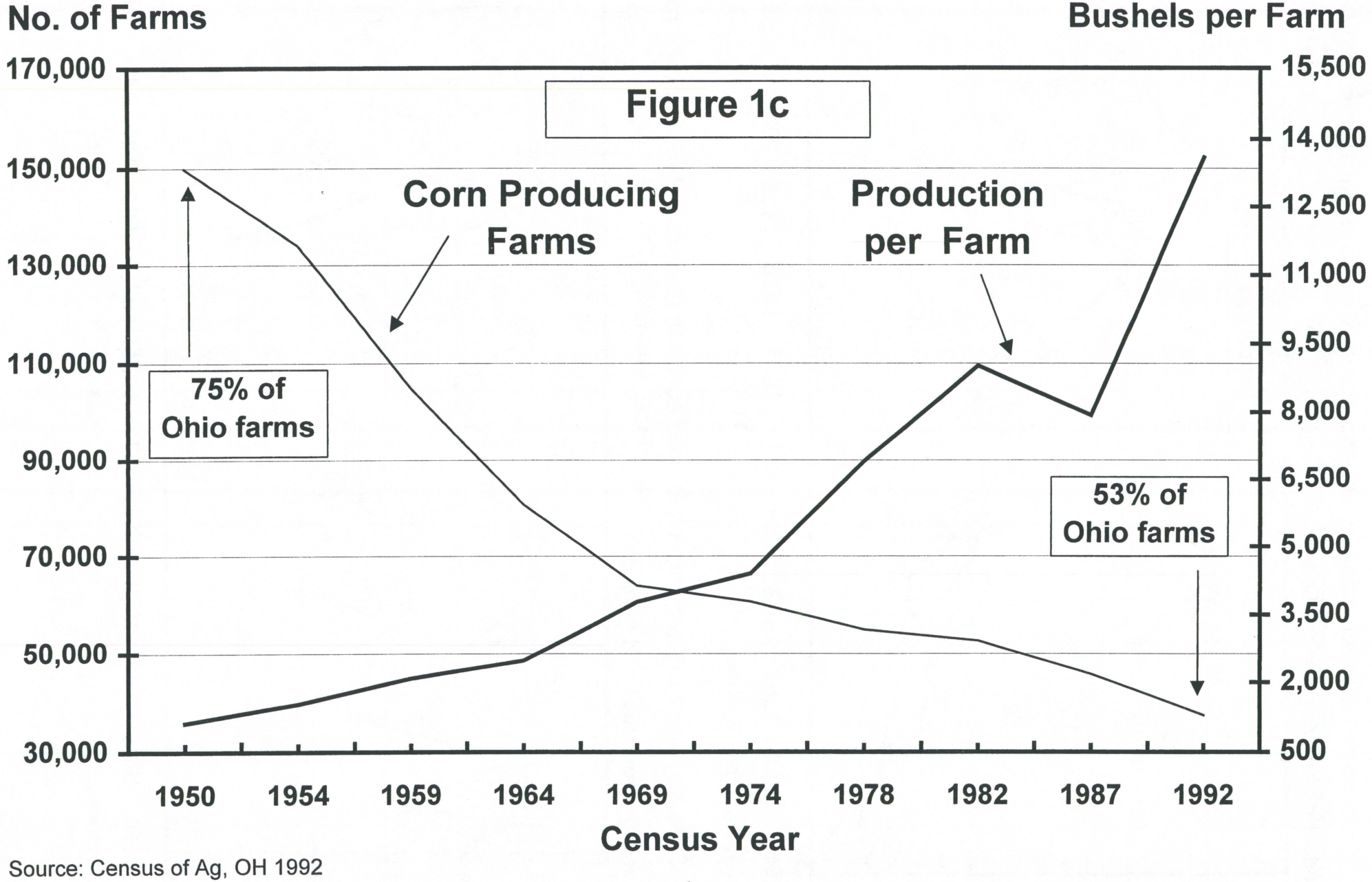
Source USDA, OH Dept of Agriculture

Ohio corn production, yield, and acreage decline modestly relative to U.S. since mid-1960s.



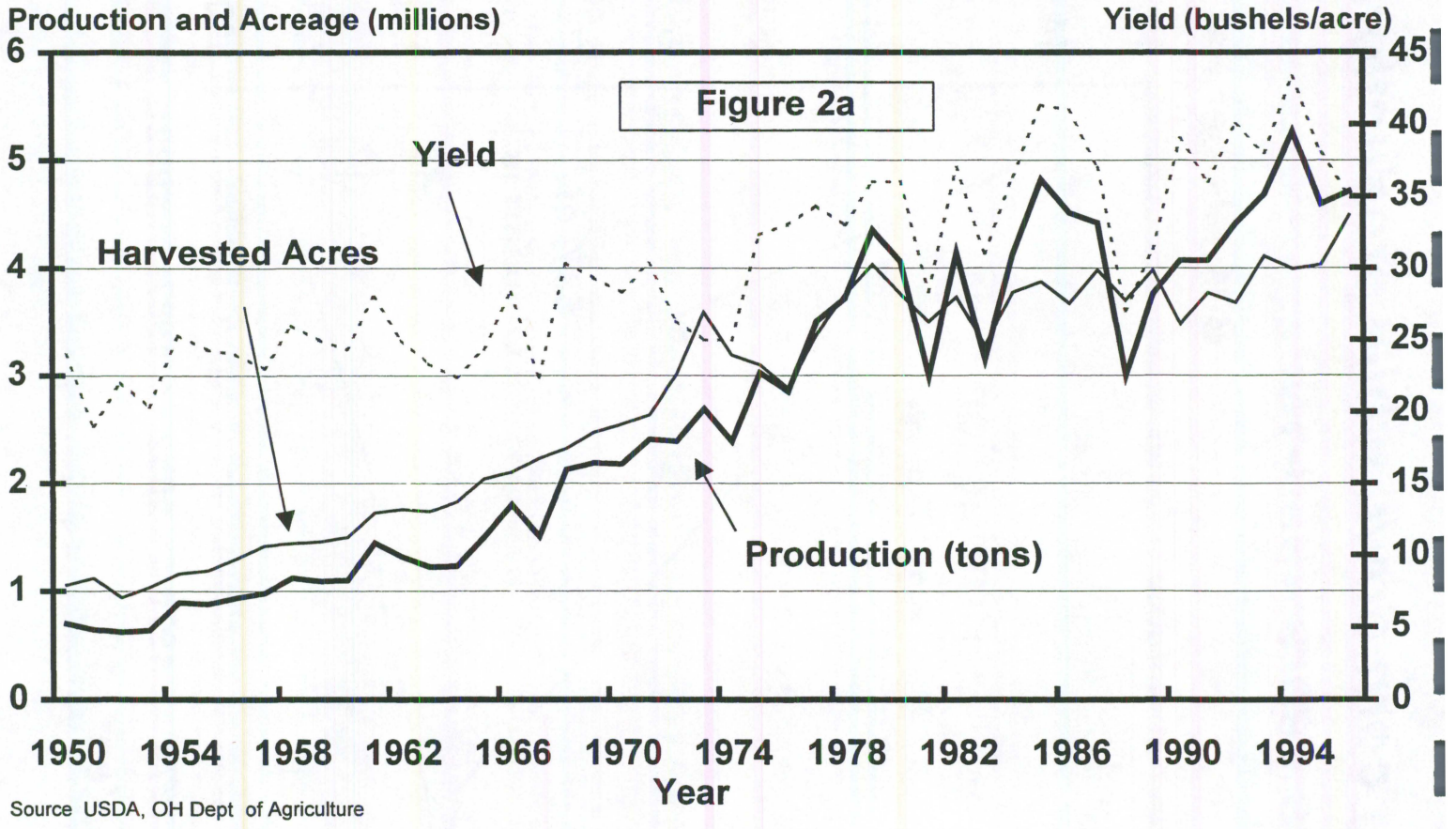
Source USDA/NASS

Number of Ohio farms producing corn down while production per farm up for census years 1950-1992.



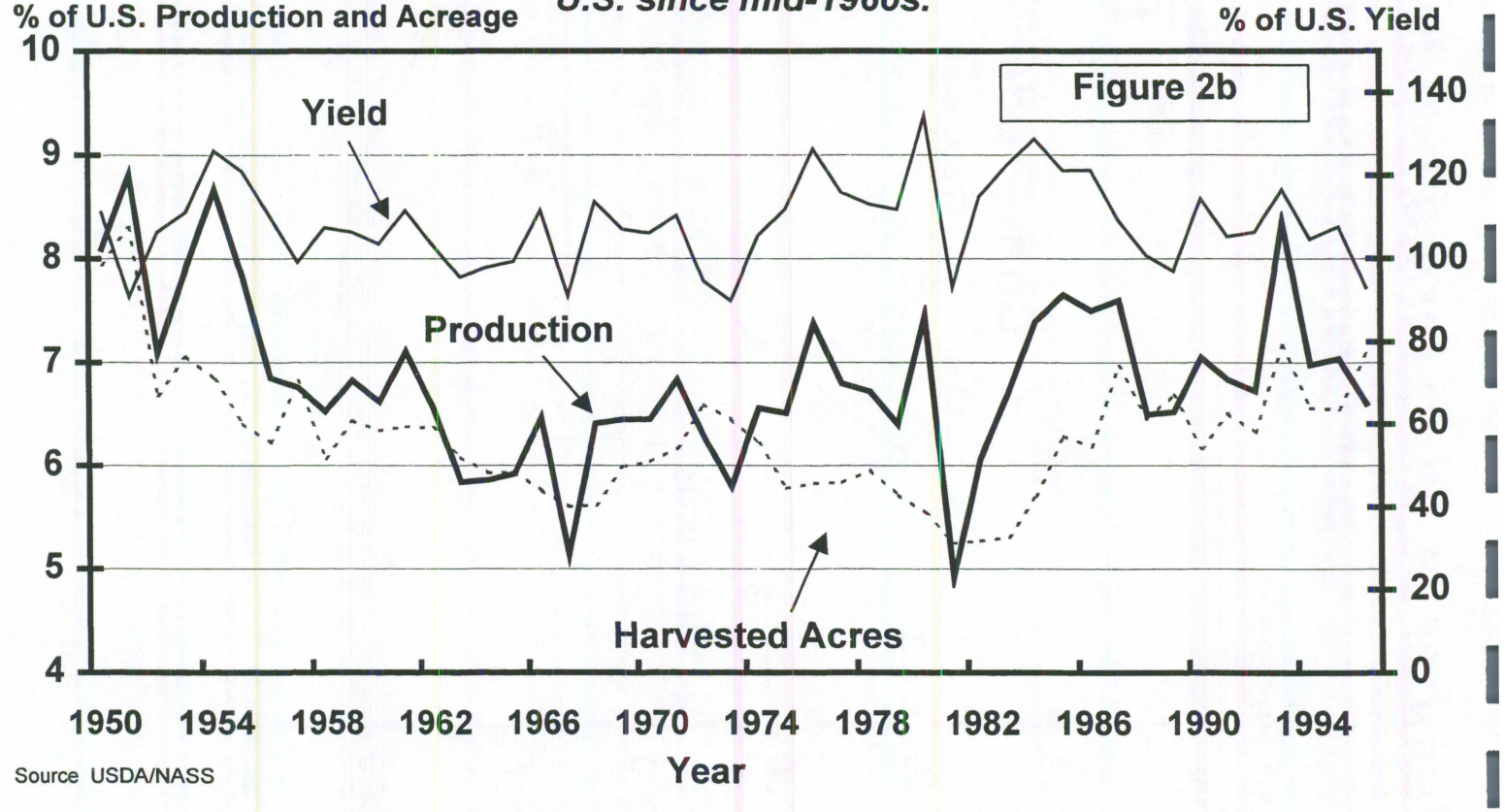
Source: Census of Ag, OH 1992

Ohio soybean production, yield, and acreage trend upward from 1950 to 1996.



Source USDA, OH Dept of Agriculture

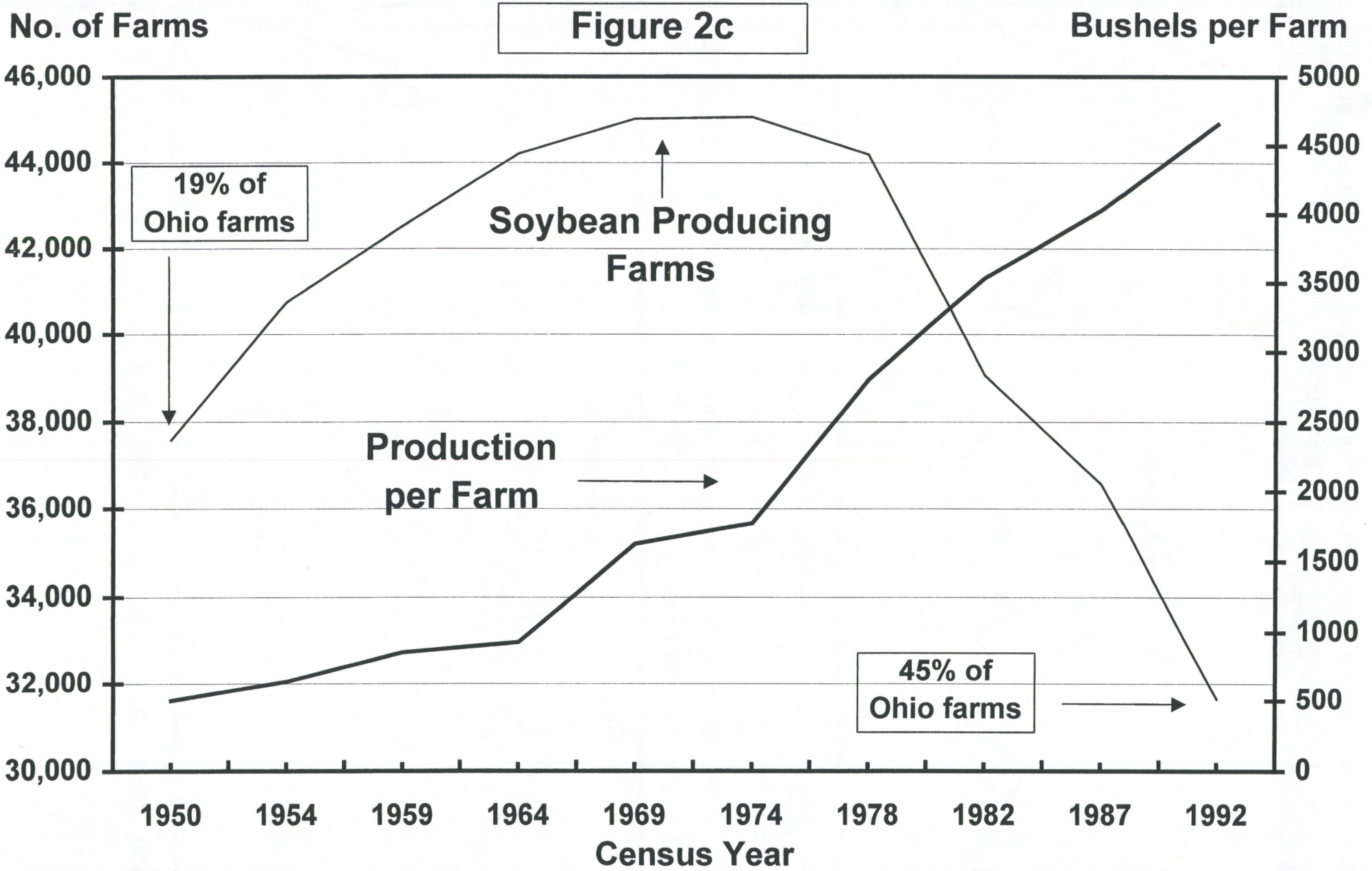
Ohio soybean production, yield, and acreage generally holding own relative to U.S. since mid-1960s.



Source USDA/NASS

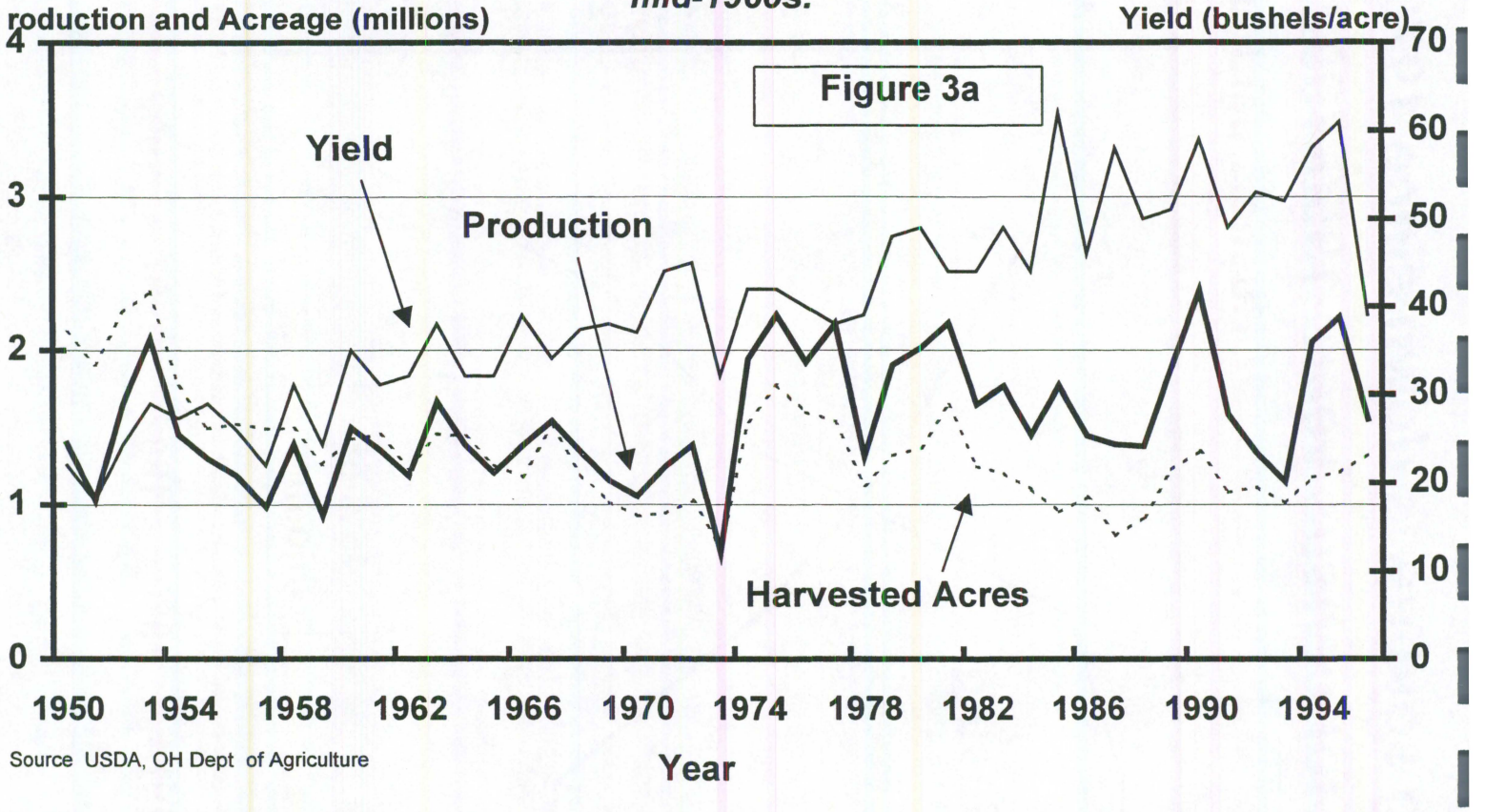
Number of Ohio farms producing soybeans down since 1970 whereas production per farm up for census years 1950-1992.

Figure 2c



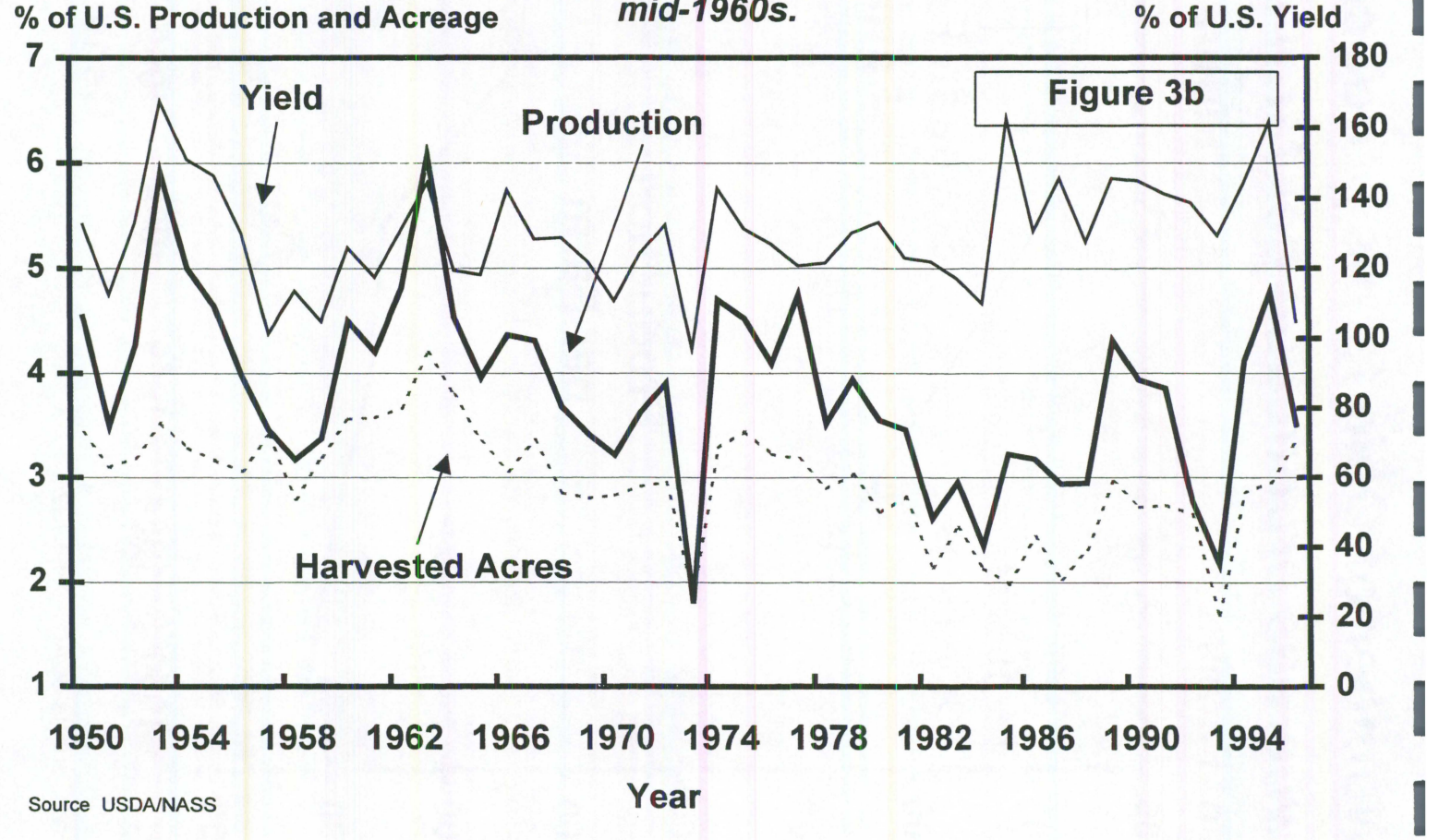
Source: Census of Ag, OH 1992

Ohio wheat acreage is fairly flat but yield and production are up somewhat since mid-1960s.



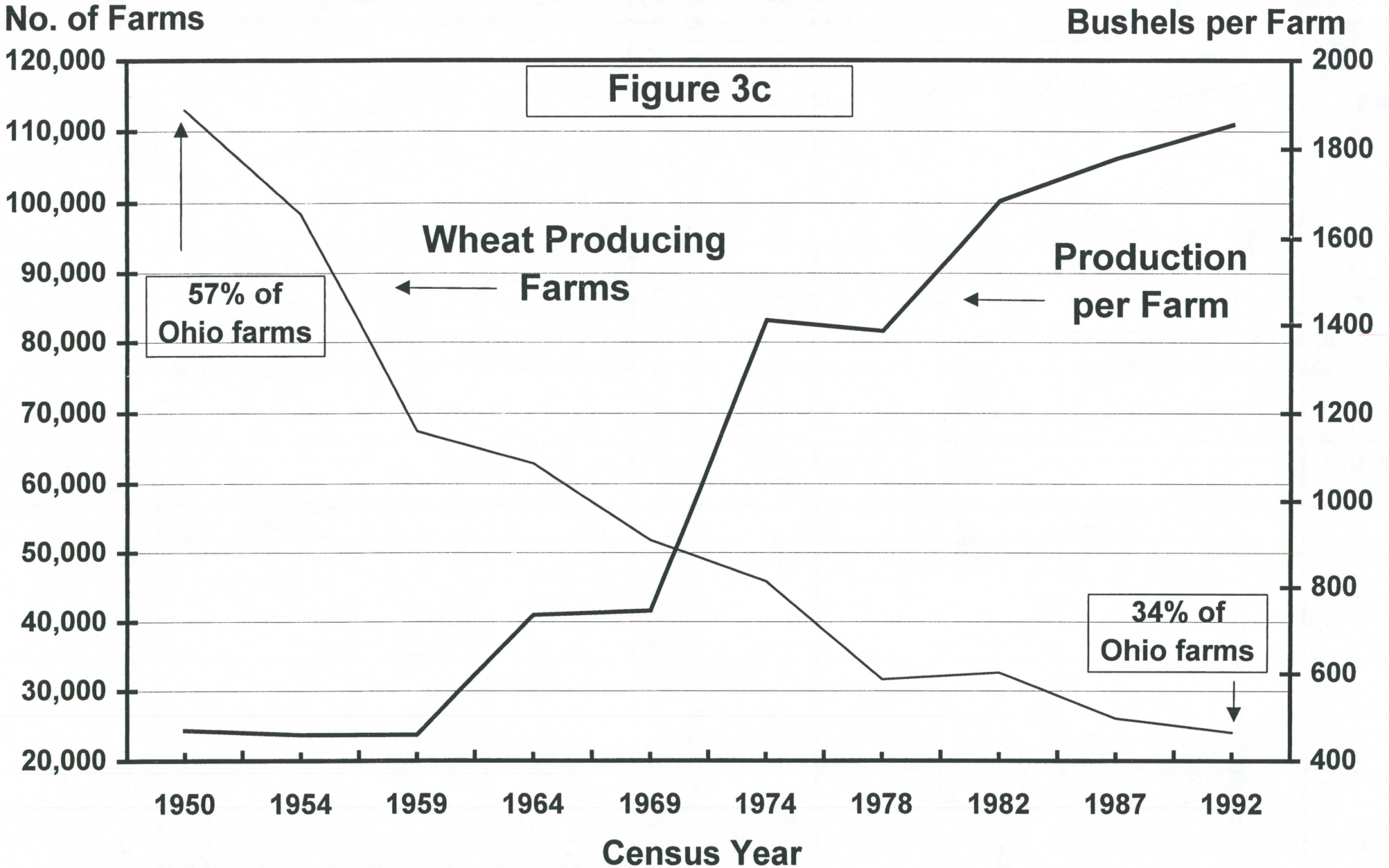
Source USDA, OH Dept of Agriculture

Ohio winter wheat production, yield, and acreage fairly flat relative to U.S. since mid-1960s.



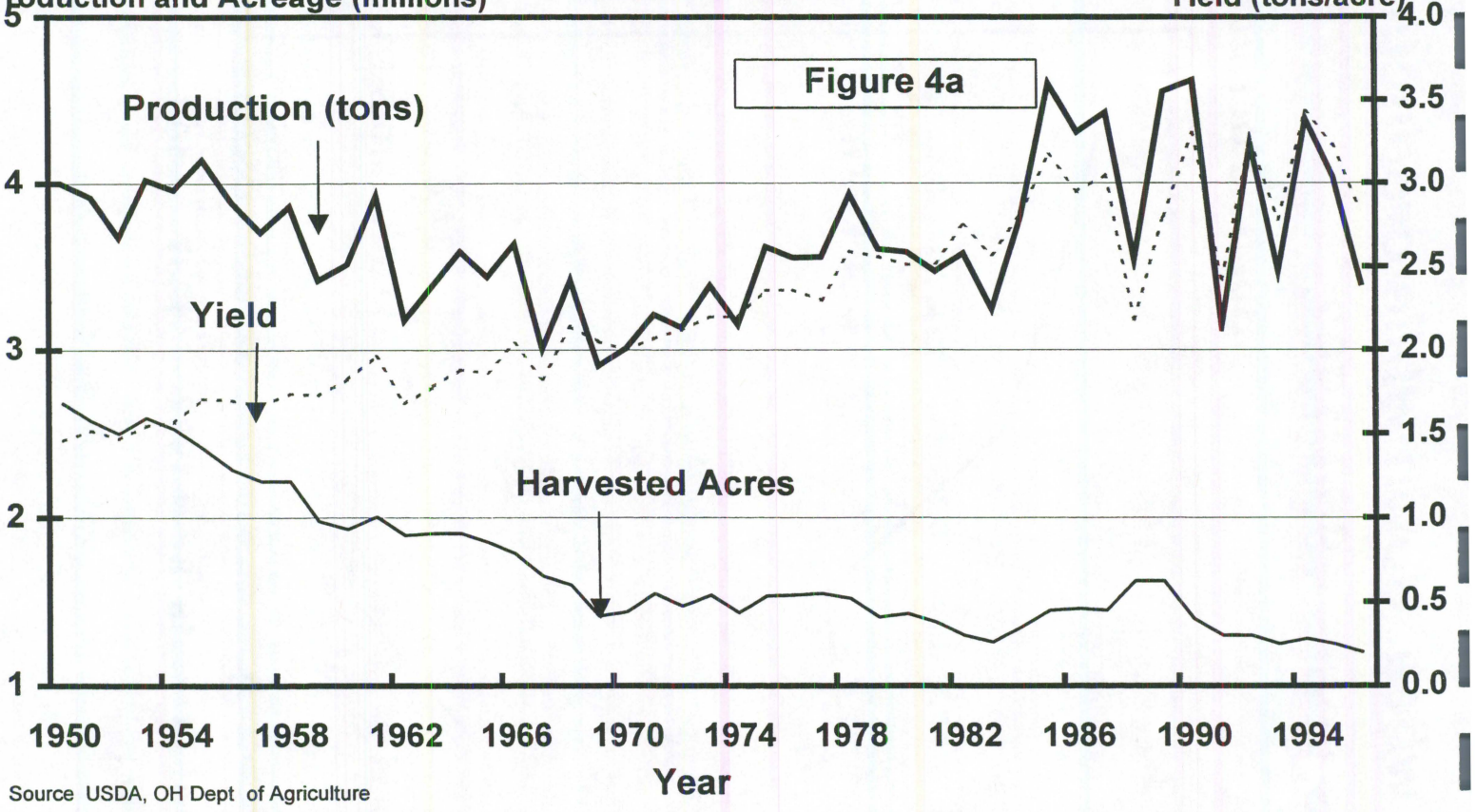
Source USDA/NASS

Number of Ohio farms producing wheat down while production per farm up for census years 1950-1992.



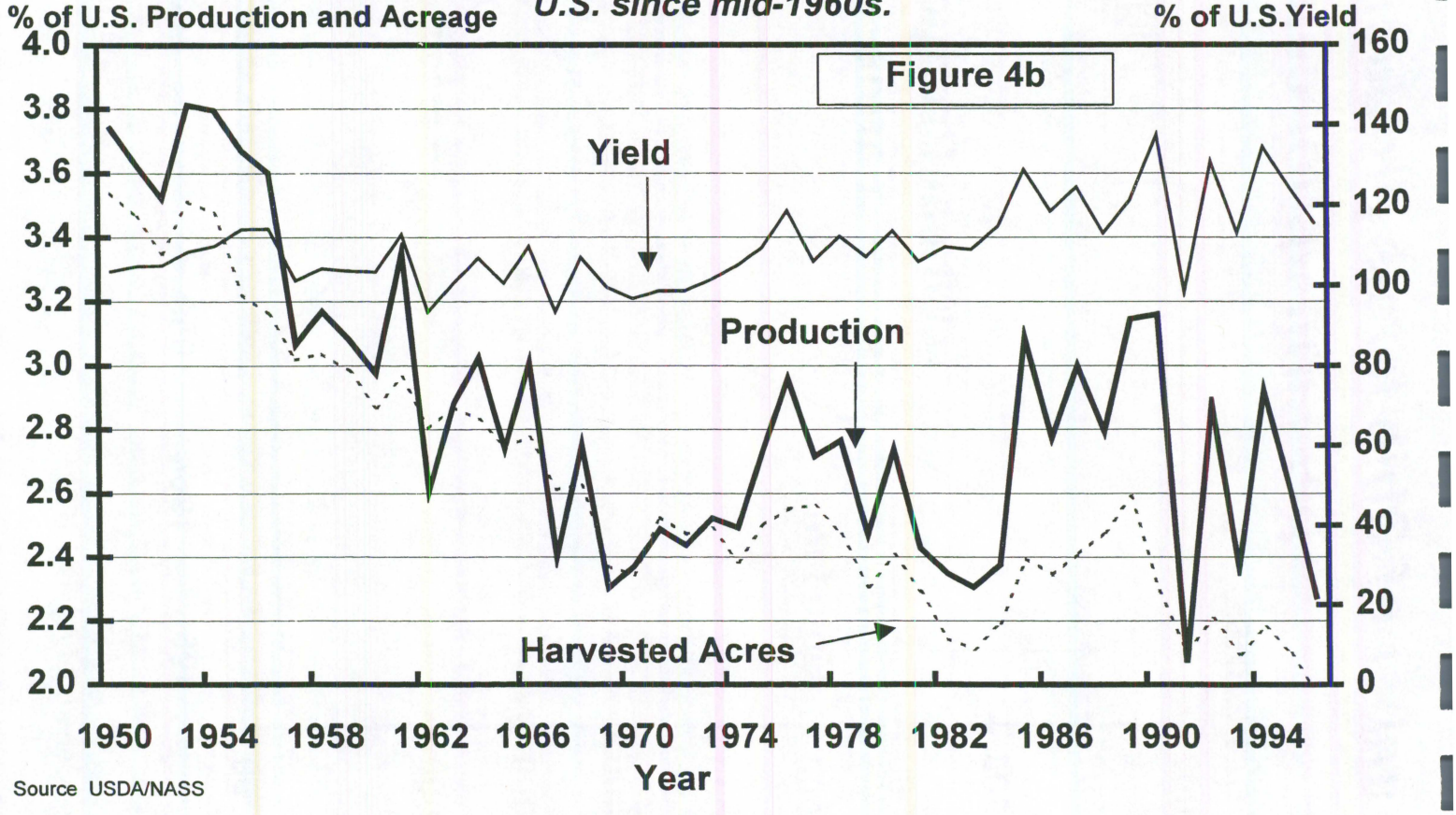
Source: Census of Ag, OH 1992

Ohio hay acreage trends down, while yield up and production fairly flat from 1950 to 1996.



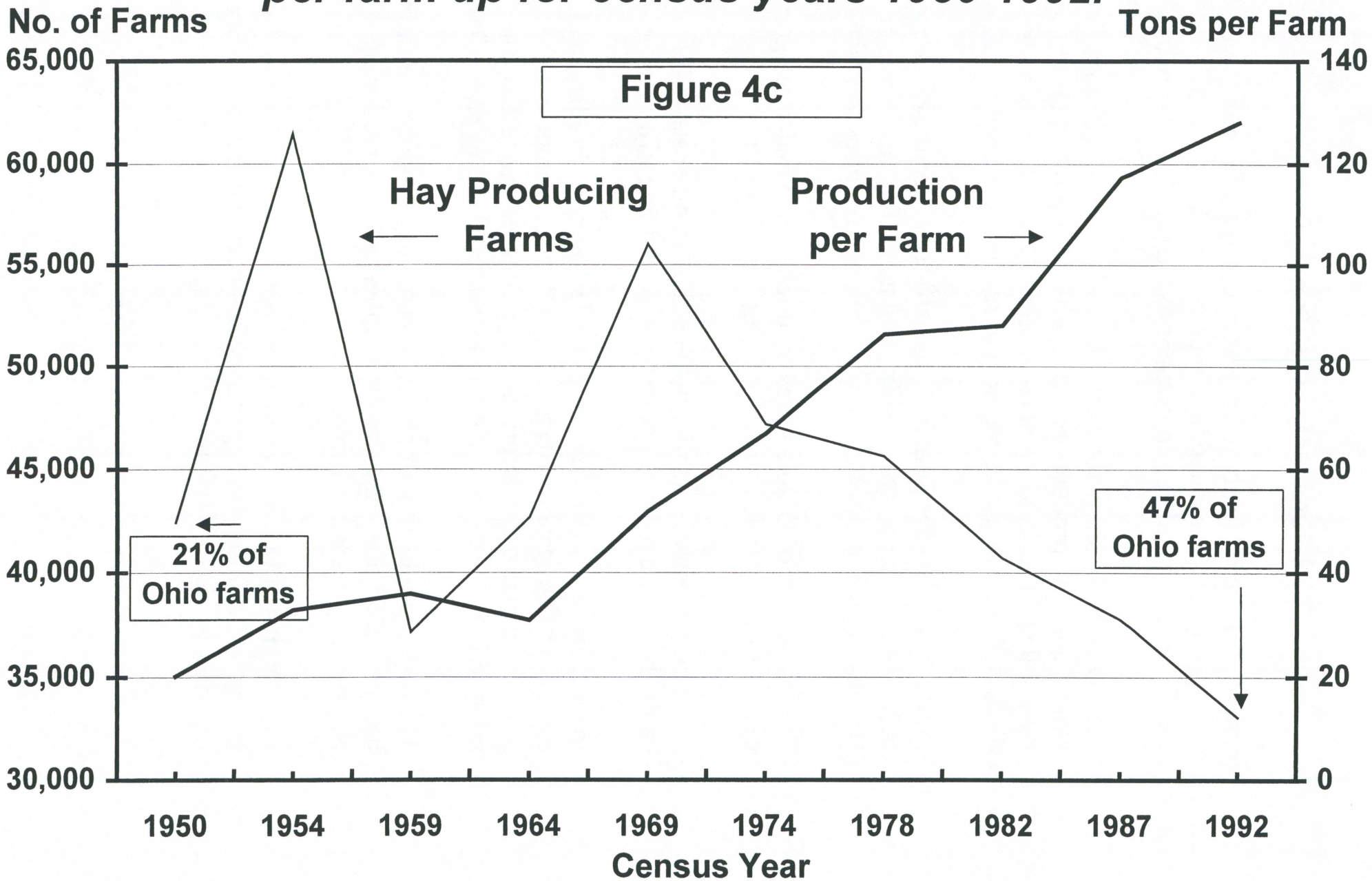
Source USDA, OH Dept of Agriculture

Ohio's hay acreage falling, yield increasing, and production fairly flat relative to U.S. since mid-1960s.



Source USDA/NASS

Number of Ohio farms producing hay down while production per farm up for census years 1950-1992.



Source: Census of Ag, OH 1992

2. Livestock and Poultry

Figures 5 to 12 graphically illustrate Ohio's loss of competitive position in hog and cattle production, a stalemate in dairy, and the emergence of poultry as a major contributor to the state's economy.

- Figures 5a to 7a show for cattle and calves, dairy, and hogs that Ohio's absolute production and relative U.S. production shares have fallen. The state is not competitive, and major changes discussed later would be required to reverse this trend.

- Production gains per farm have not offset the decline in number of farms producing cattle, calves, and hogs (Figures 5b and 6b). Hence overall state production has dropped (Figures 5a and 6a).

- The proportion of Ohio's farms producing each major category of livestock has fallen since 1950 (Figures 5b to 10b).

- Average herd size is smaller in Ohio than in other states for cattle, hogs, and dairy (Figures 5c to 7c and 5d to 7d).

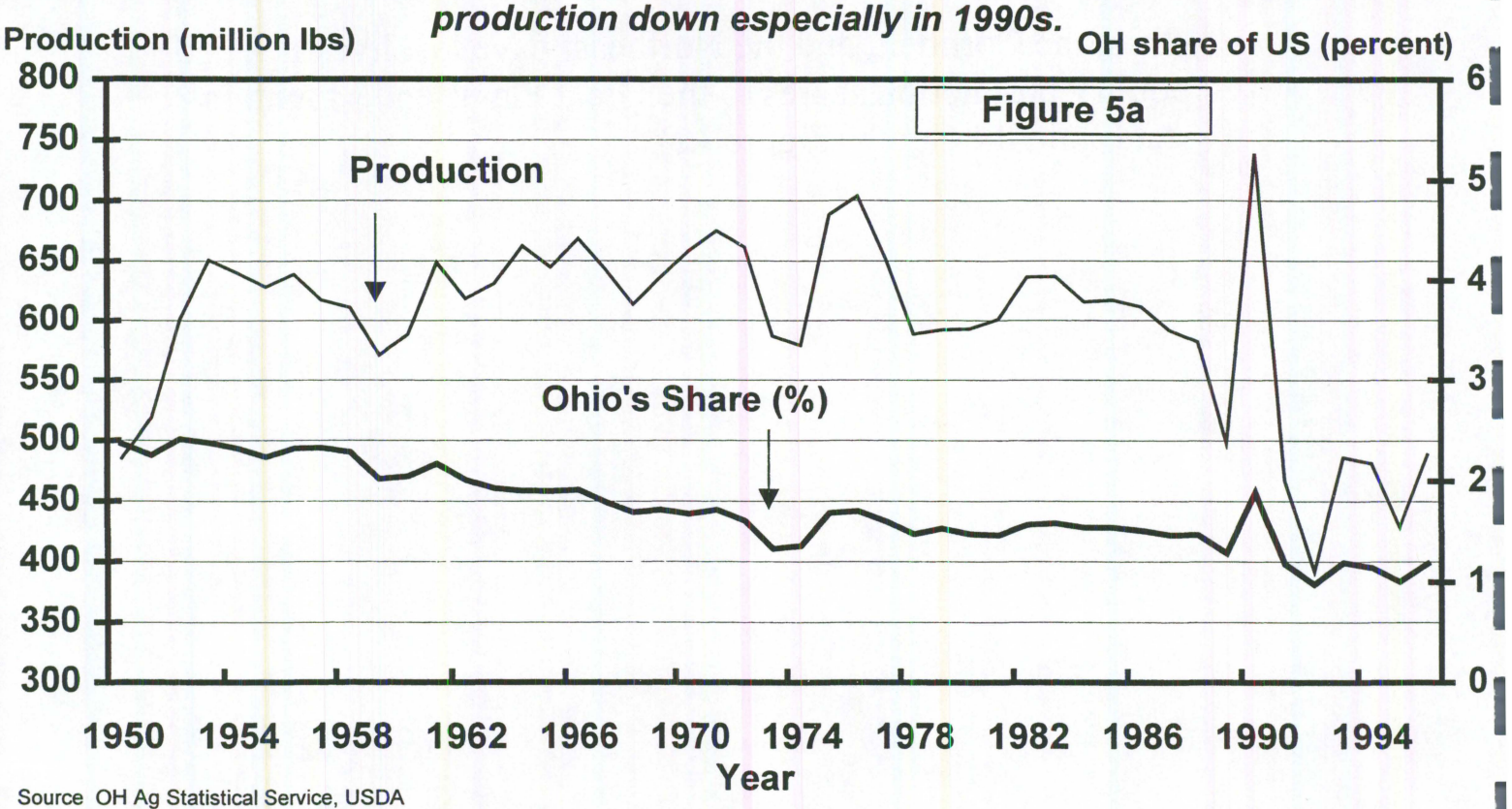
- In contrast, production measures for laying hens, broilers, and turkeys in Figures 8 to 10 show that Ohio can compete in the most industrialized enterprises in agriculture. Production and relative U.S. shares have sharply increased (Figures 8a to 10a).

- The rise in production of poultry and poultry products per farm has more than offset the drop in number of farms producing poultry (Figures 8b to 10b).

- Dairy's share of Ohio livestock and poultry production has changed very little; the big change has been the displacement of red meat by poultry (Figure 11).

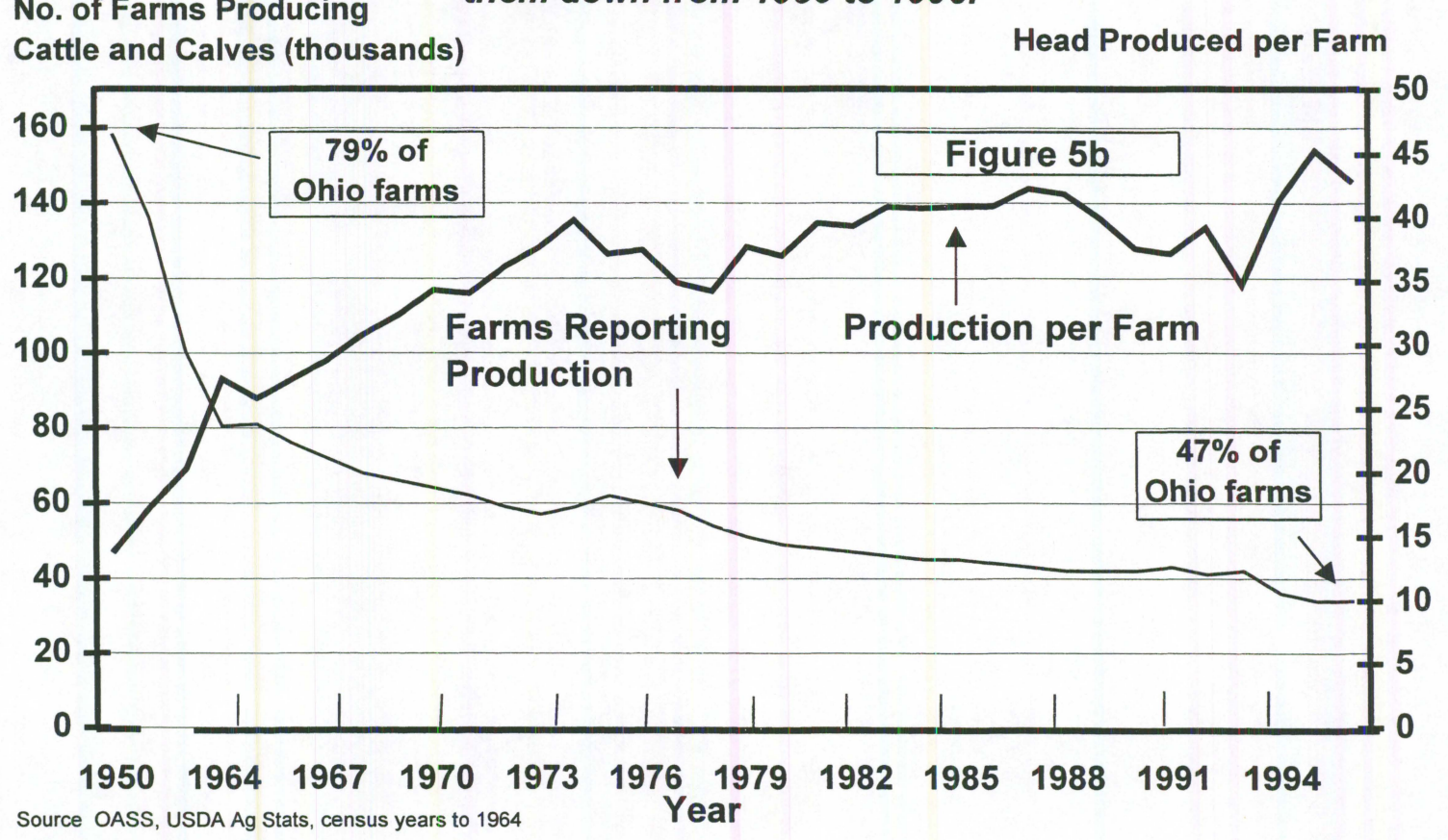
- Ohio, the Cornbelt, and the Northeast have lost livestock and poultry production shares to the Great Plains and Mountain states and the South (Figure 12).

Ohio's share of U.S. cattle and calf production has trended down since 1950. Beef production down especially in 1990s.



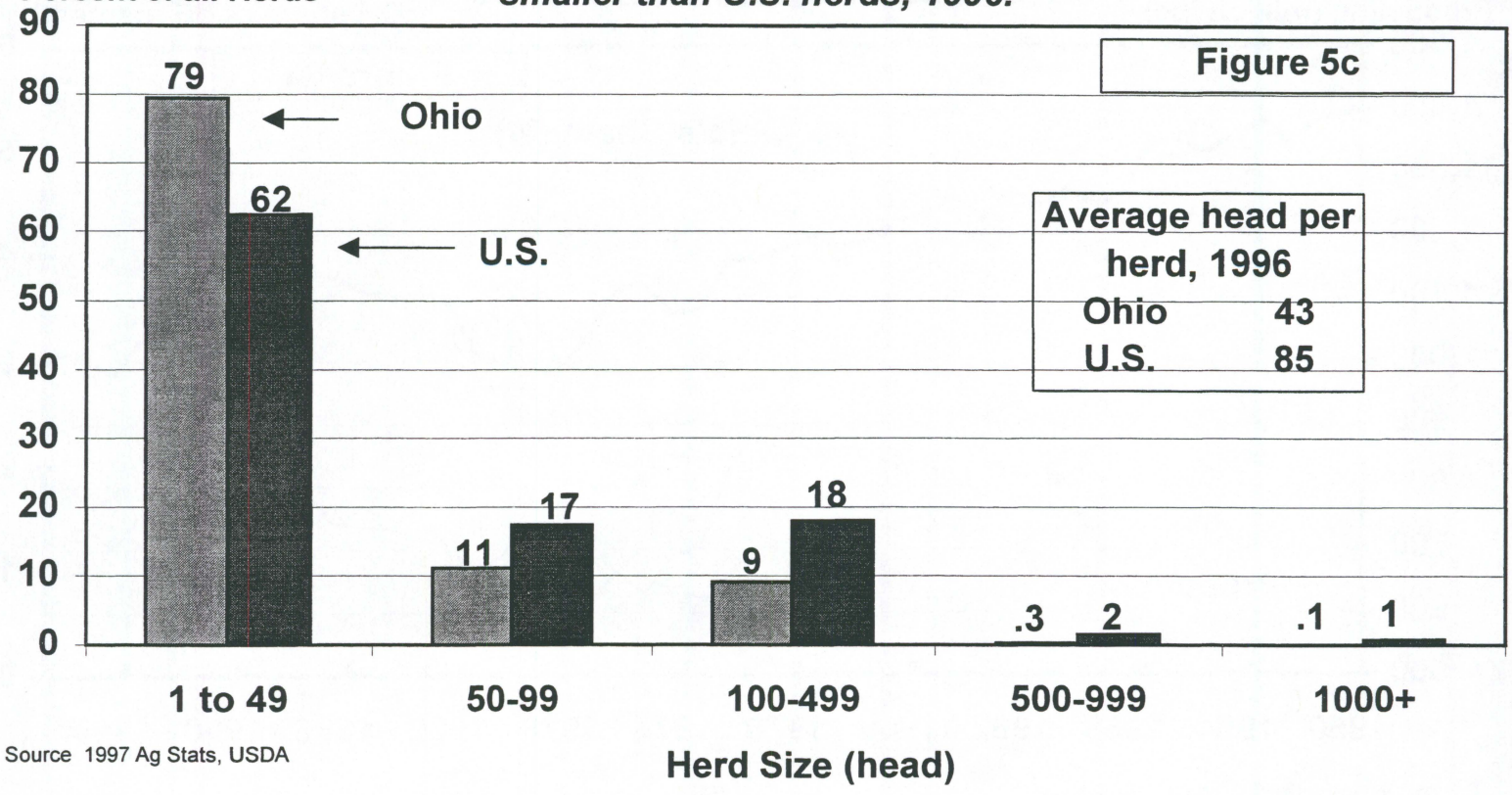
Source OH Ag Statistical Service, USDA

Ohio cattle and calf production per farm up but the number of farms producing them down from 1950 to 1996.



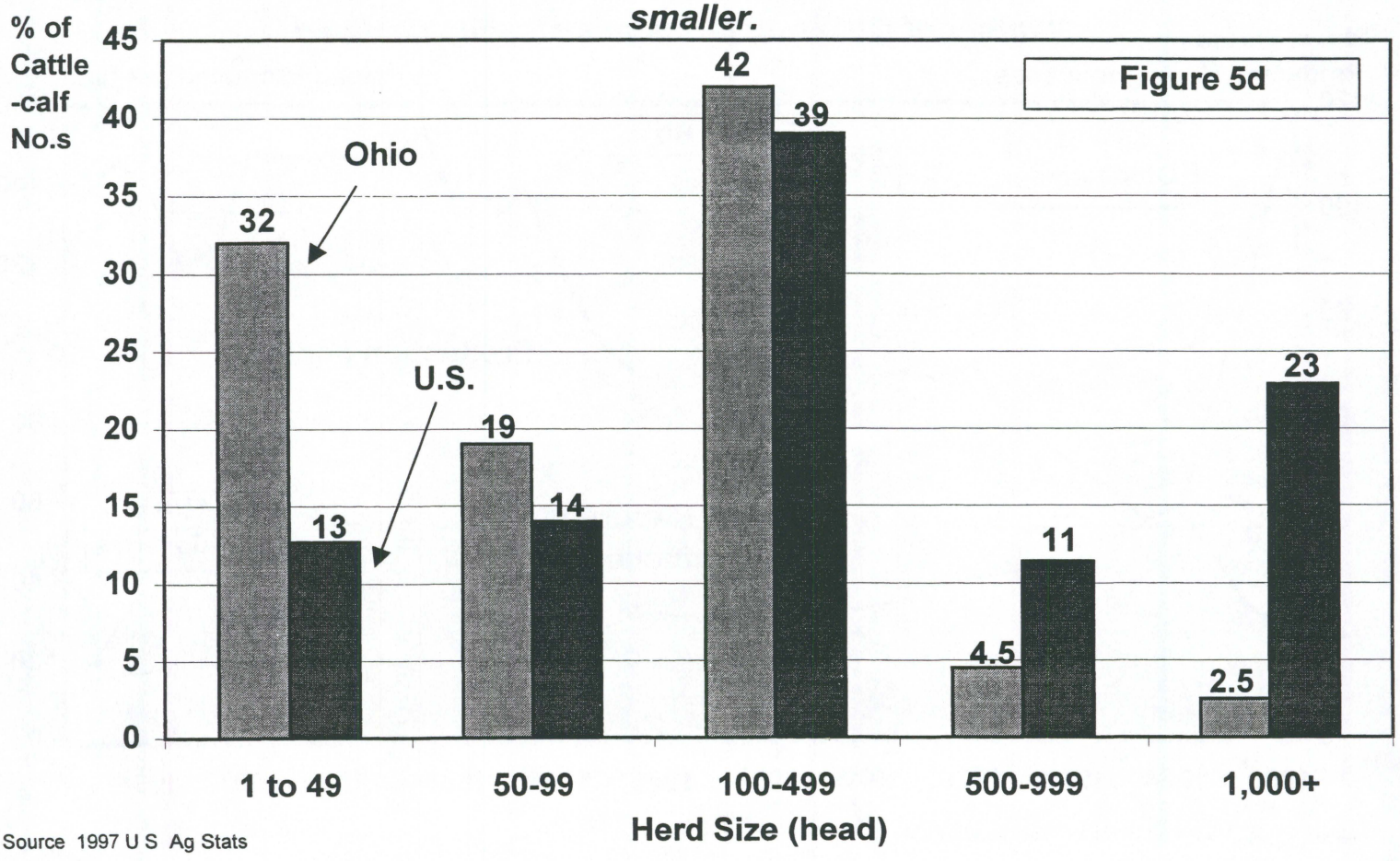
Source OASS, USDA Ag Stats, census years to 1964

Most cattle and calf herds small in Ohio and the U.S. Ohio herds are on average smaller than U.S. herds, 1996.



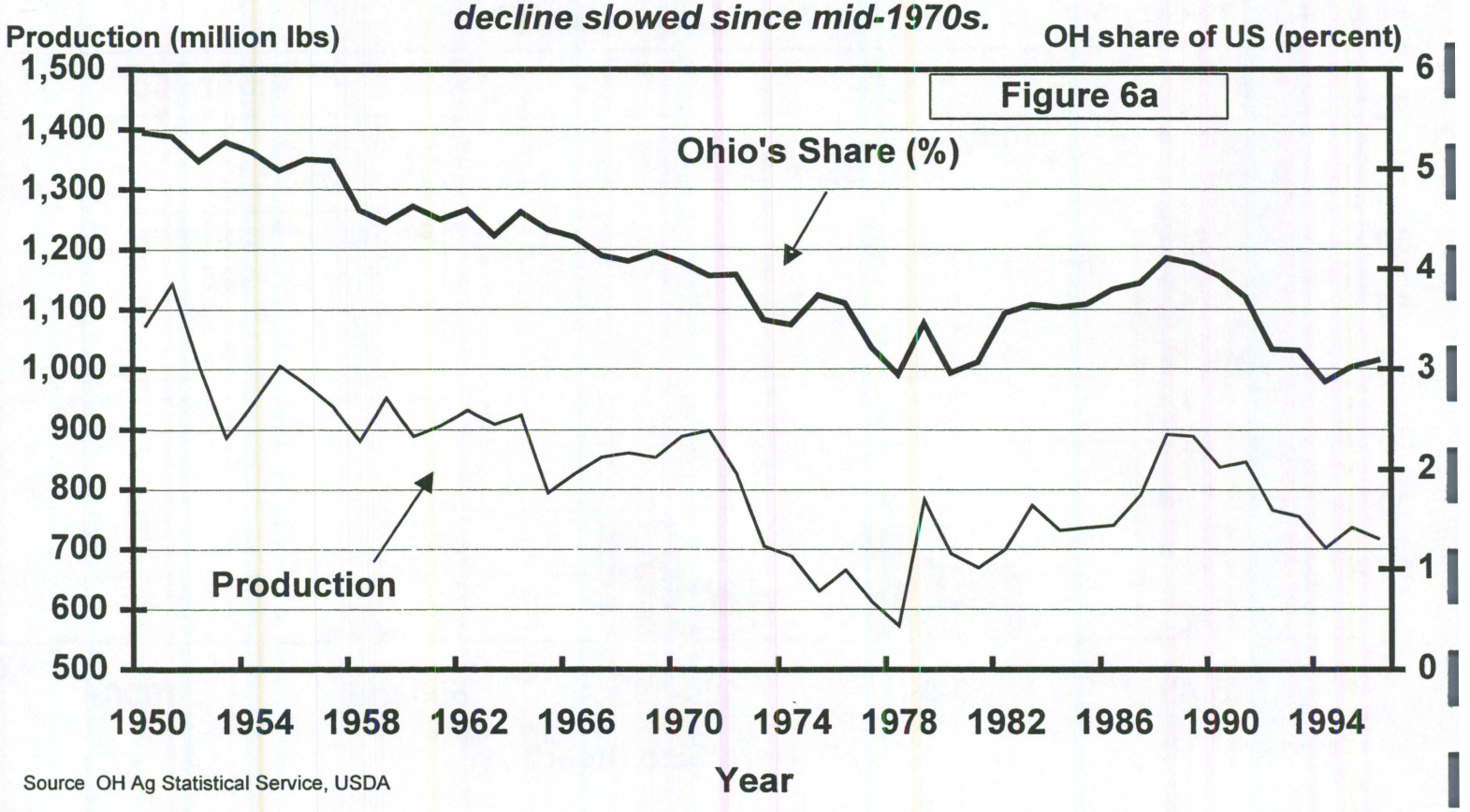
Source 1997 Ag Stats, USDA

Most cattle and calves in mid-size herds in Ohio and U.S. in 1996 but Ohio herds smaller.



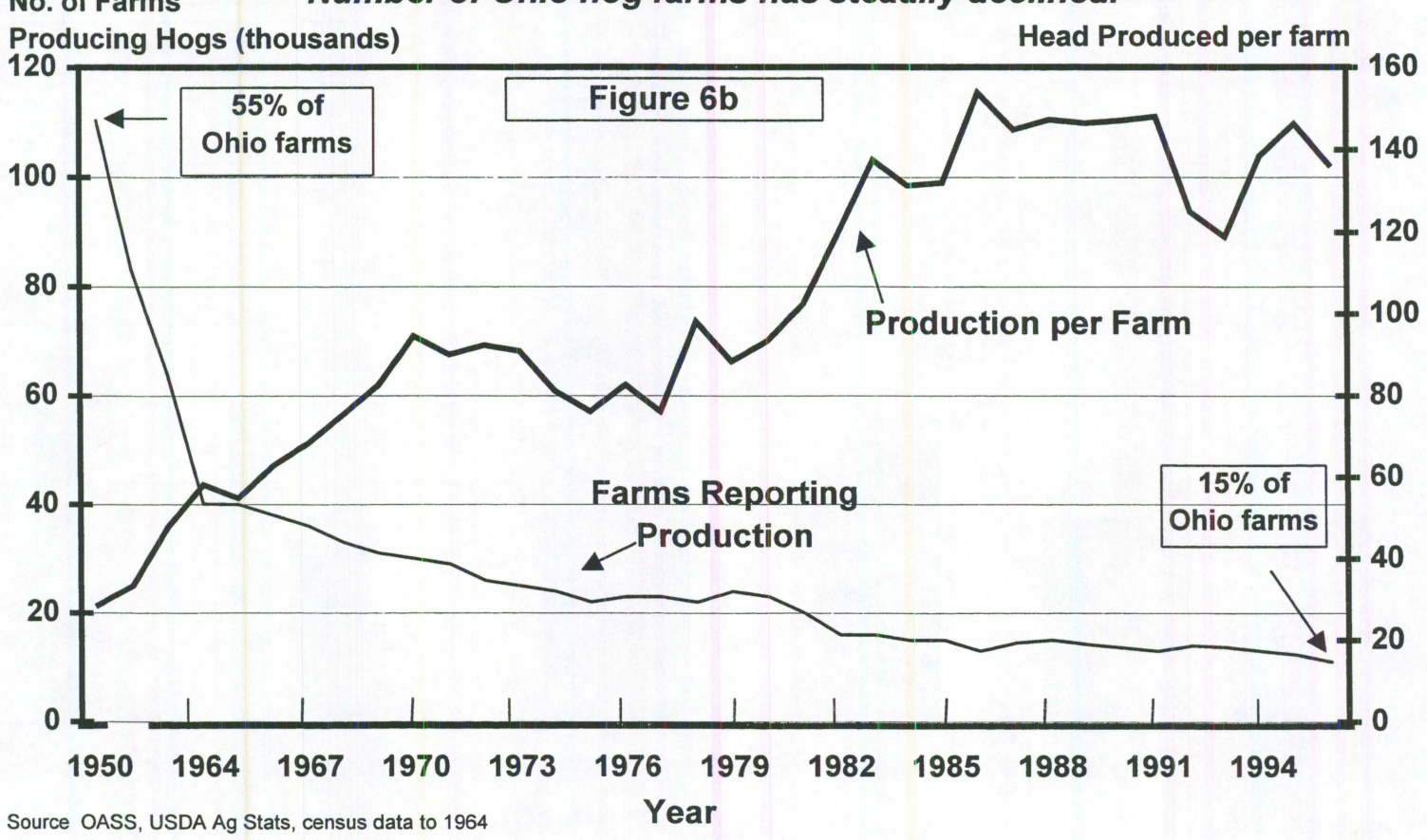
Source 1997 U S Ag Stats

Ohio's pork production and share of U.S. pork production down from 1950, but the decline slowed since mid-1970s.



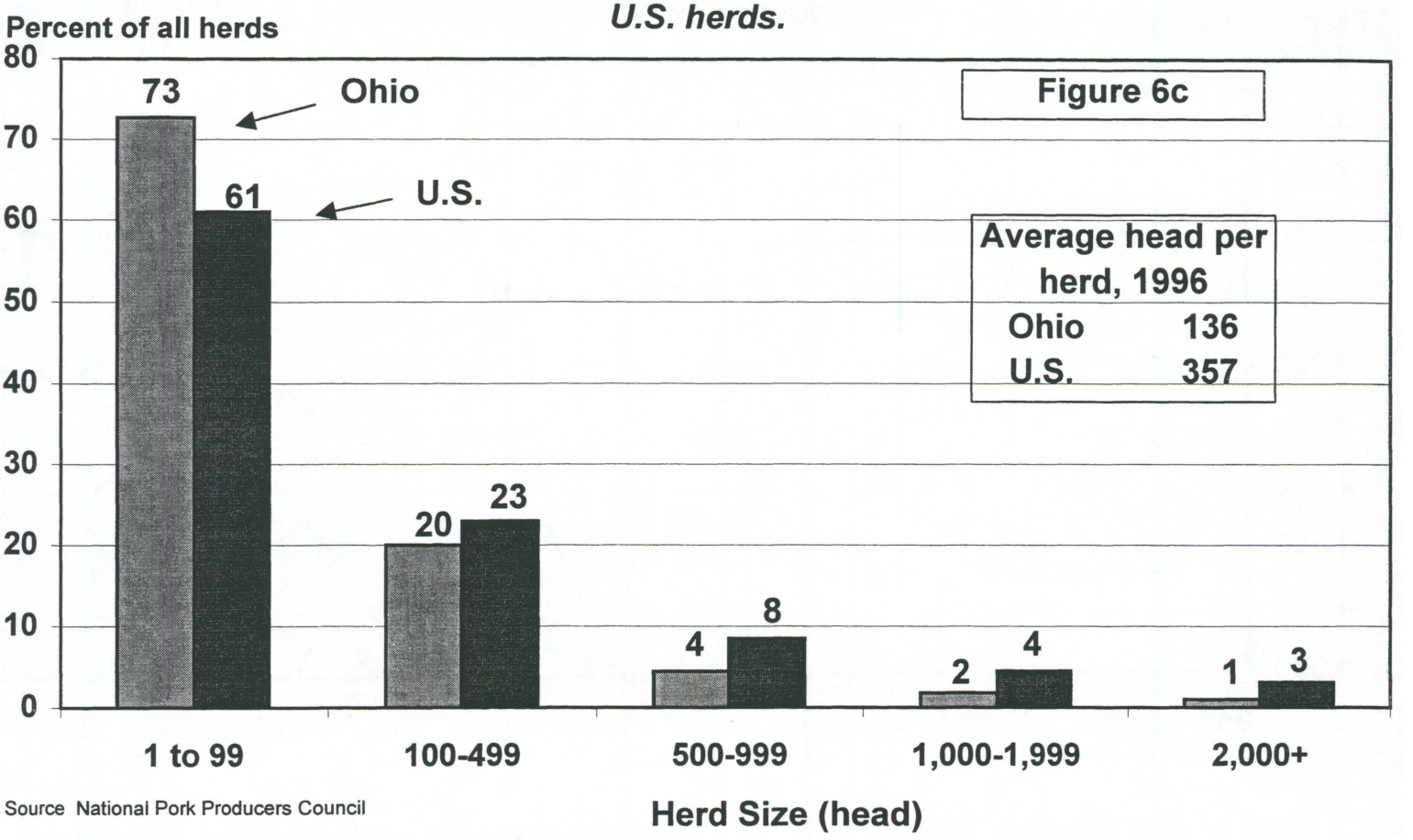
Source OH Ag Statistical Service, USDA

Number of hogs produced per farm increased until the 1980s, then plateaued. Number of Ohio hog farms has steadily declined.



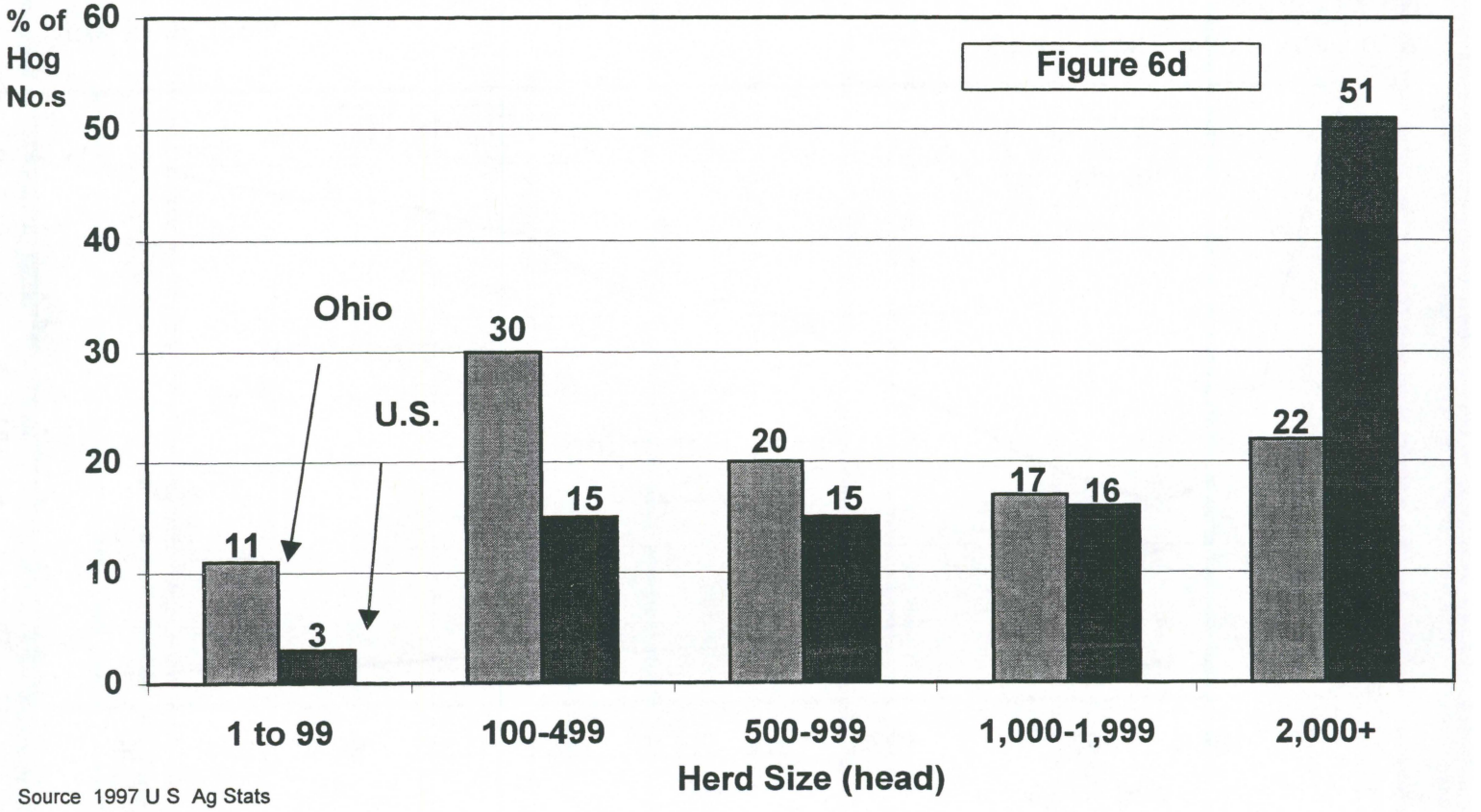
Source OASS, USDA Ag Stats, census data to 1964

Most Ohio and U.S. hog herds small in 1996, but Ohio herd smaller on average than U.S. herds.



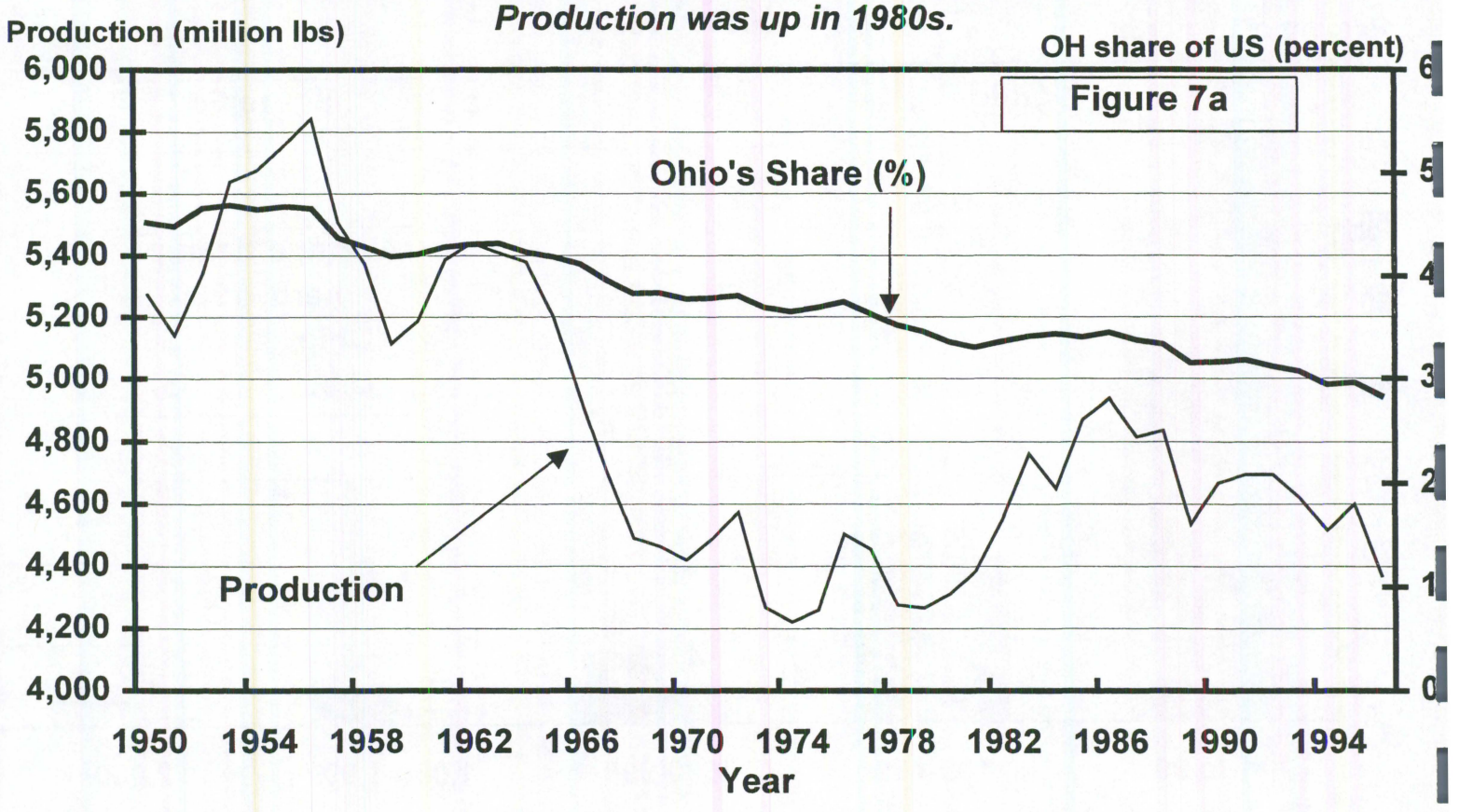
Source National Pork Producers Council

Ohio's hogs were in smaller herds than U.S. hogs in 1996.

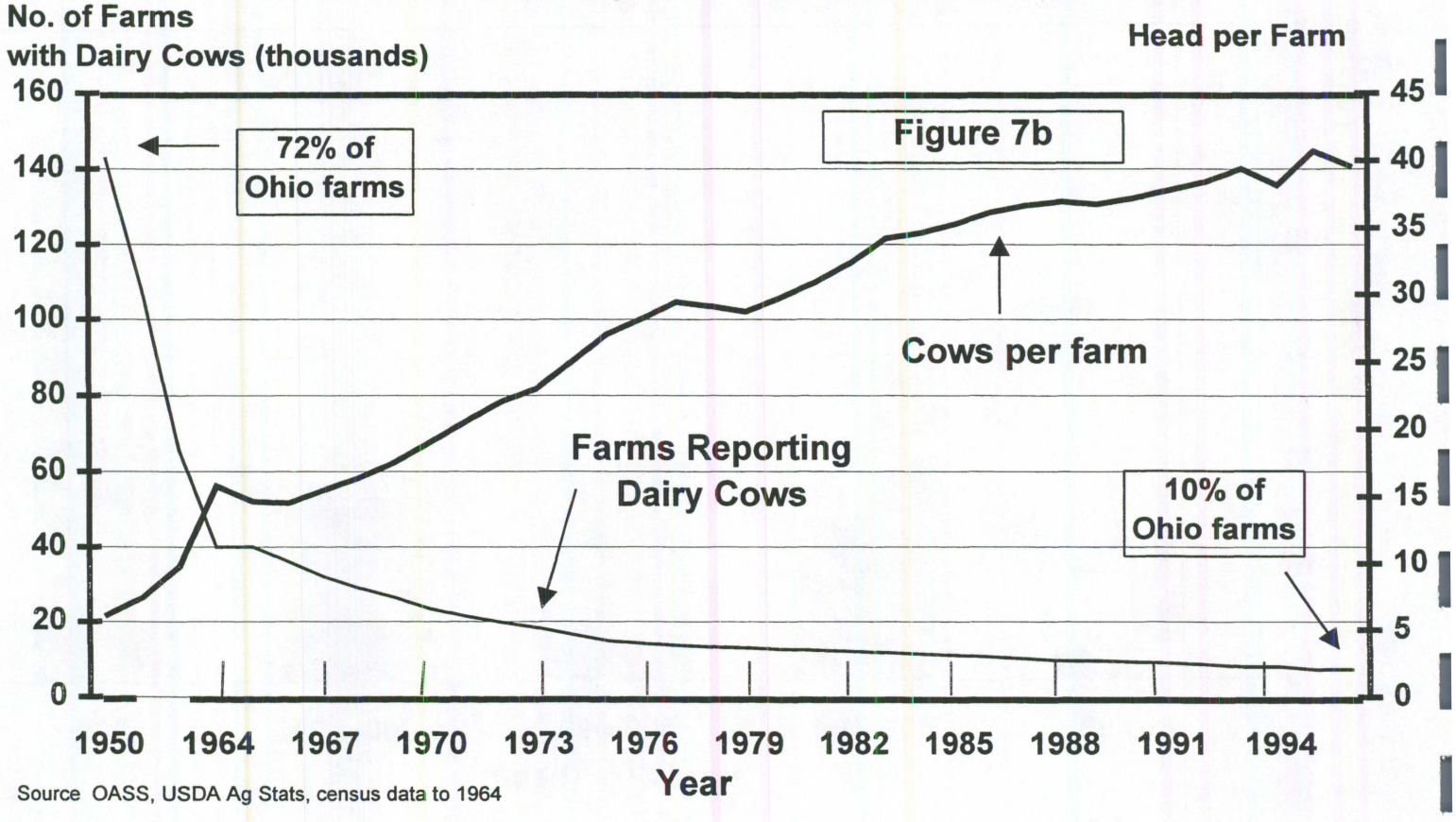


Source 1997 U S Ag Stats

Ohio's annual milk production and share of U.S. production down from 1950. Production was up in 1980s.

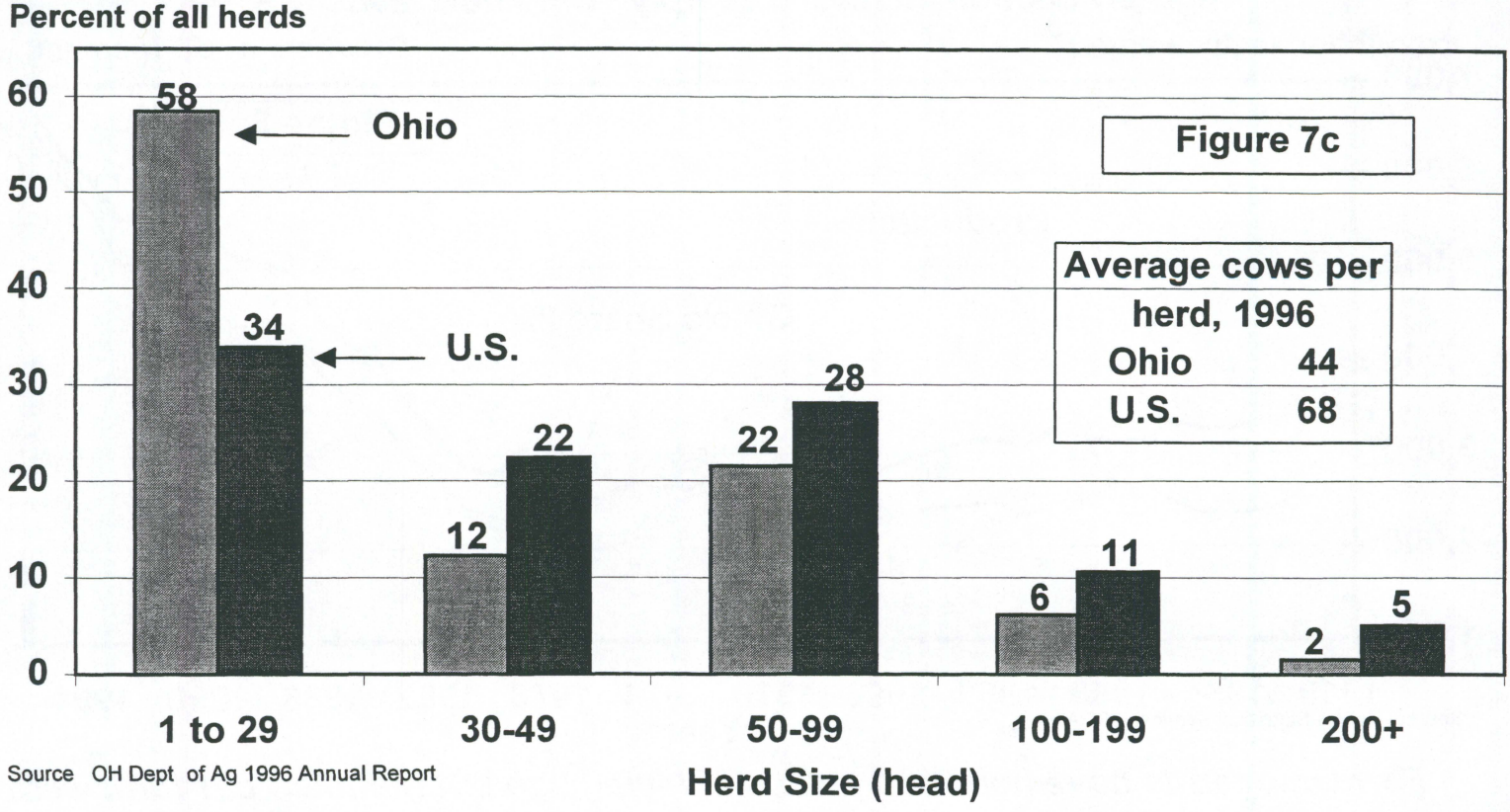


Fewer farms produce milk but cow numbers per farm up from 1964 to 1996 in Ohio. Increase in cows per farm slowed in 1980s and 1990s.



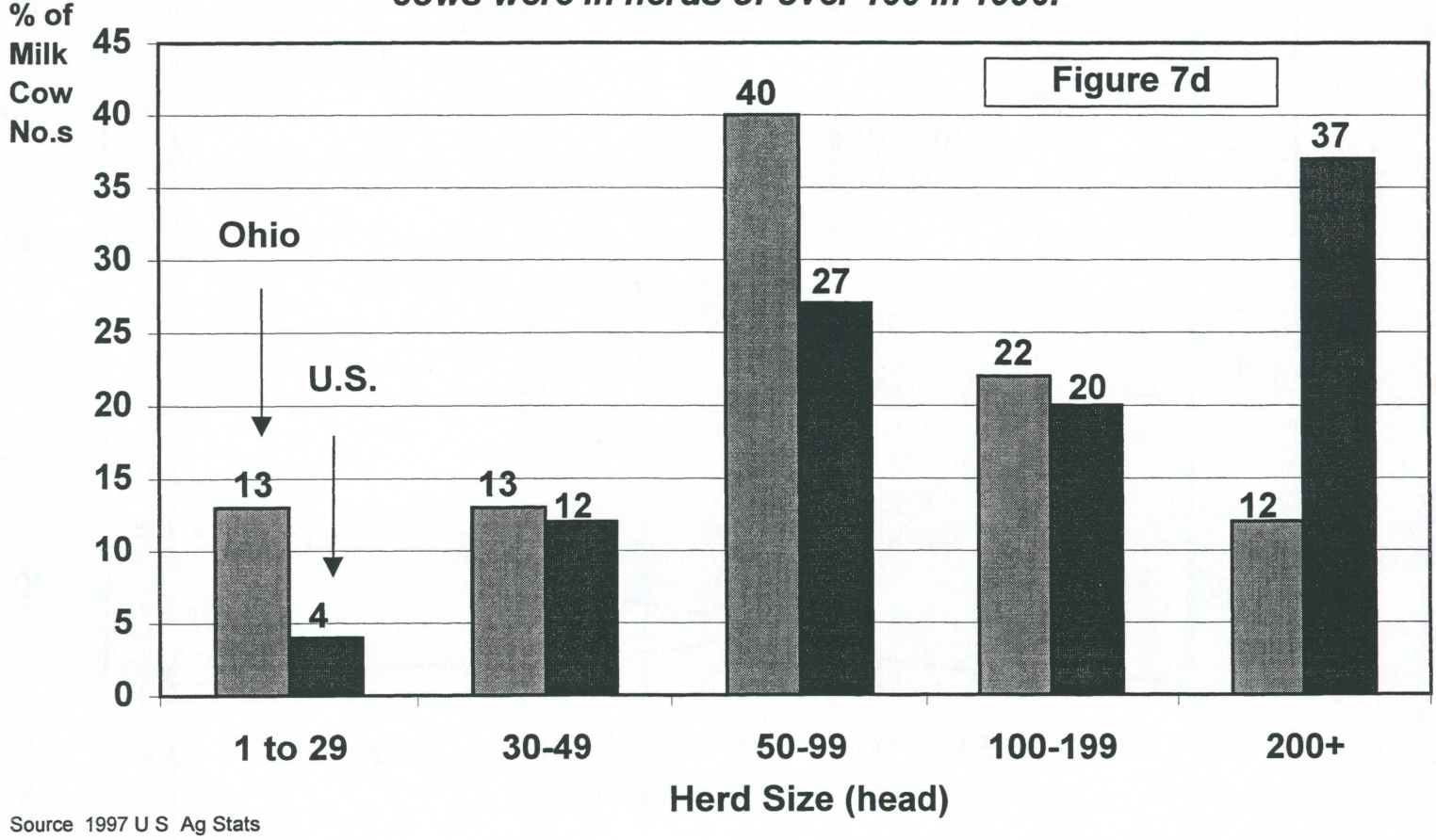
Source OASS, USDA Ag Stats, census data to 1964

Ohio's milk cow herds on average are smaller than U.S. cow herds, 1996.



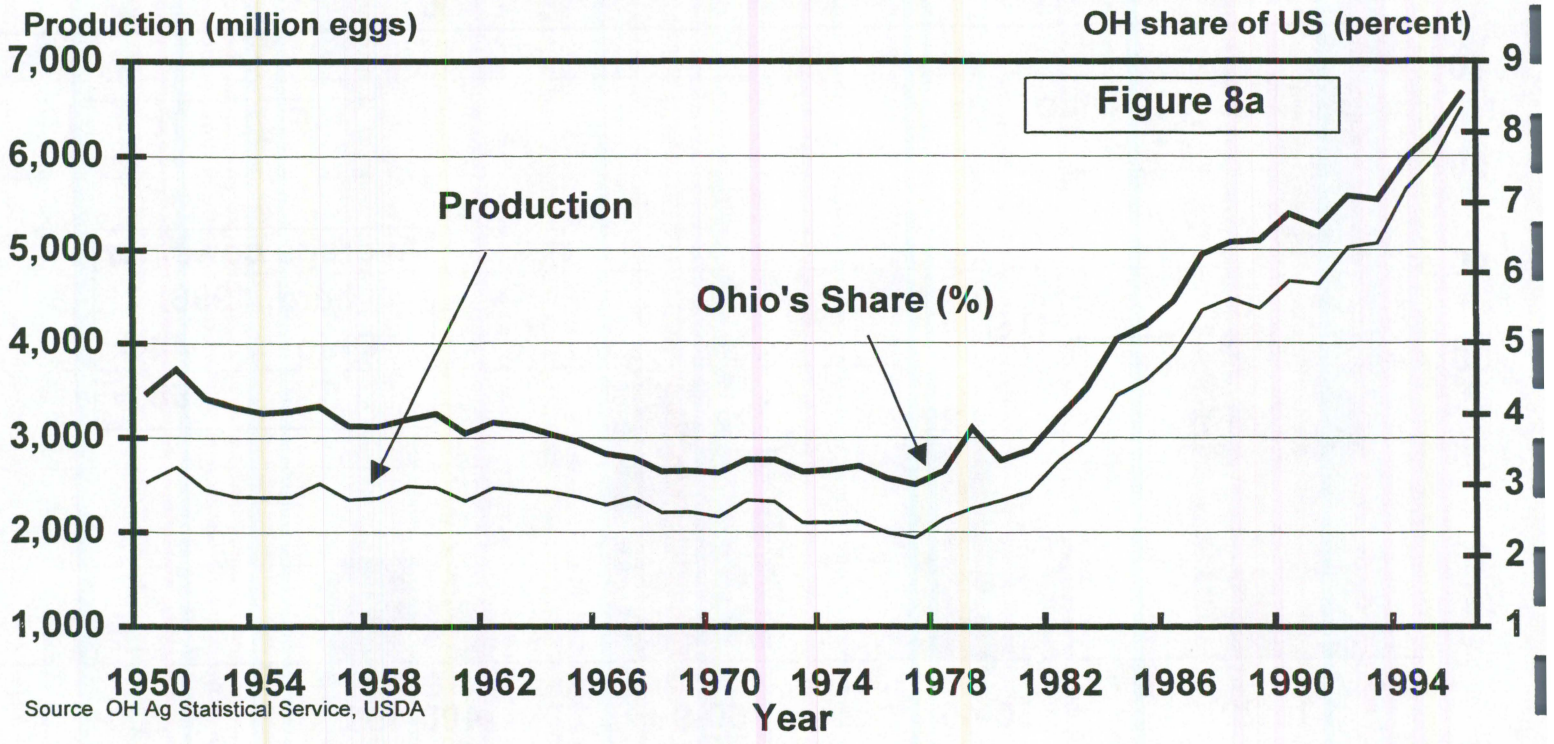
Source OH Dept of Ag 1996 Annual Report

Most of Ohio's dairy cows were in herds of less than 100 while most U.S. dairy cows were in herds of over 100 in 1996.



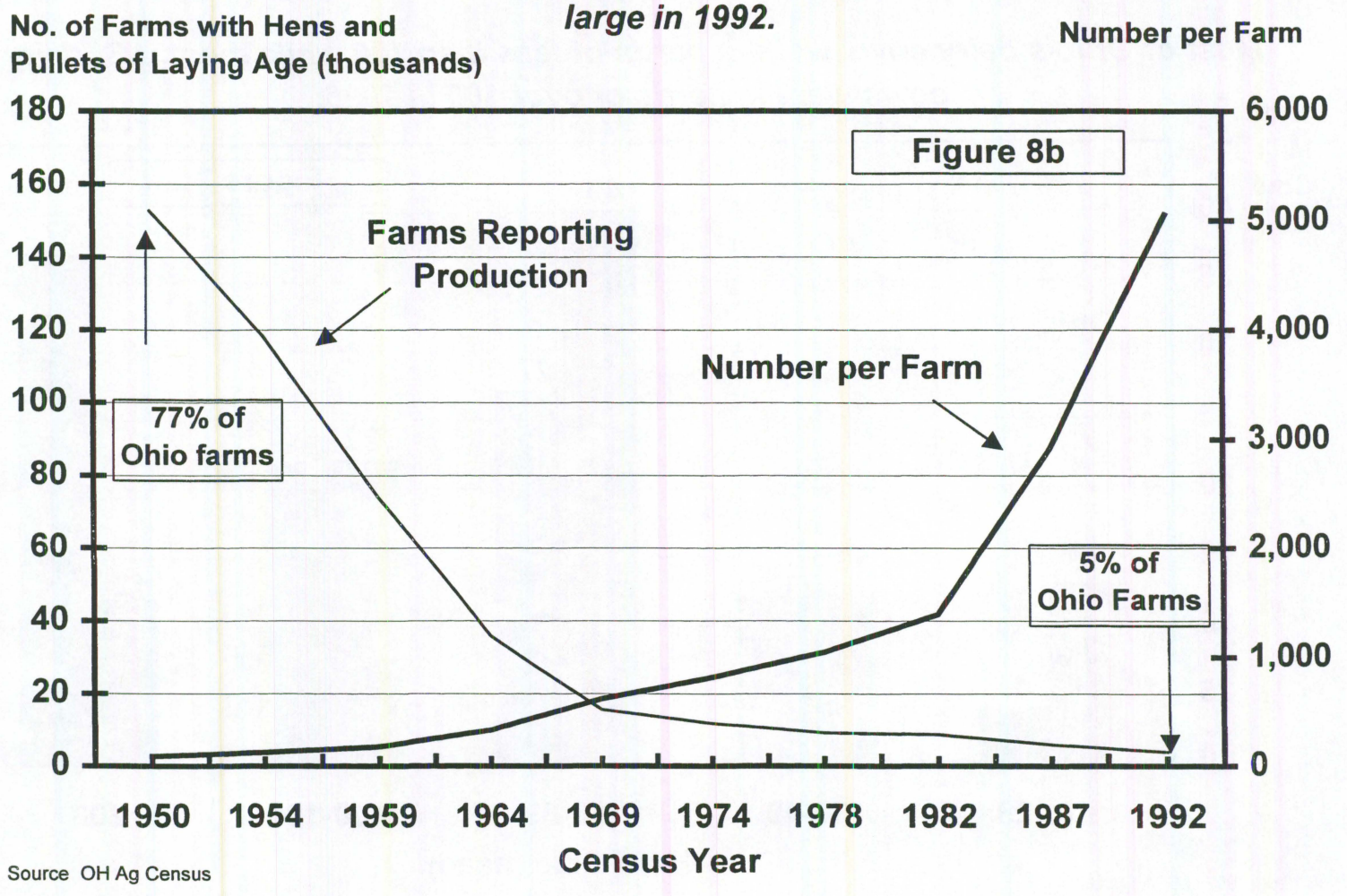
Source 1997 U S Ag Stats

After falling from 1950 to late 1970s, Ohio's total egg production and share of U.S. egg production increased sharply. Ohio now leads U.S.



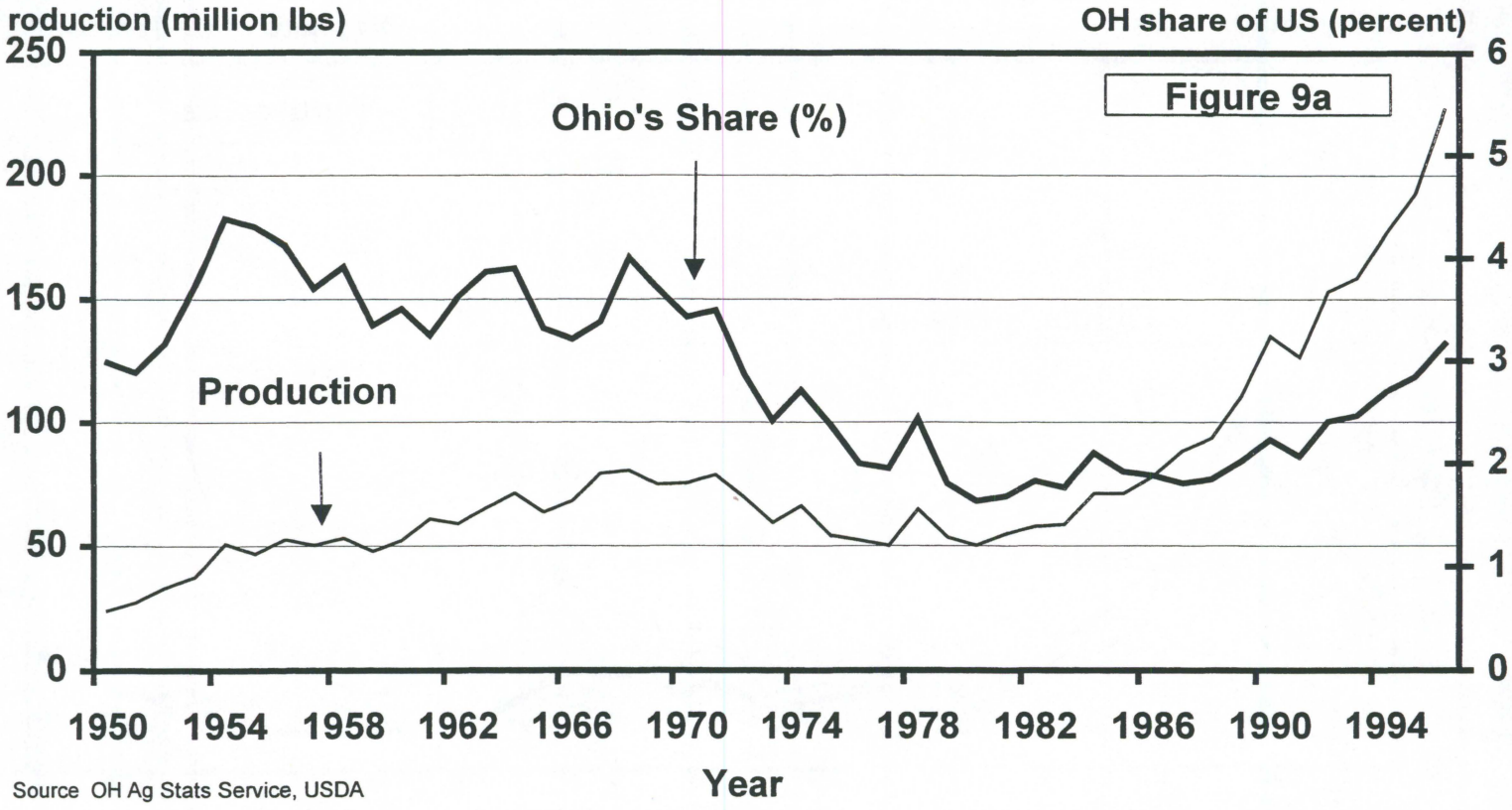
Source OH Ag Statistical Service, USDA

Few Ohio farms have hens and pullets of laying age but numbers per farm were large in 1992.



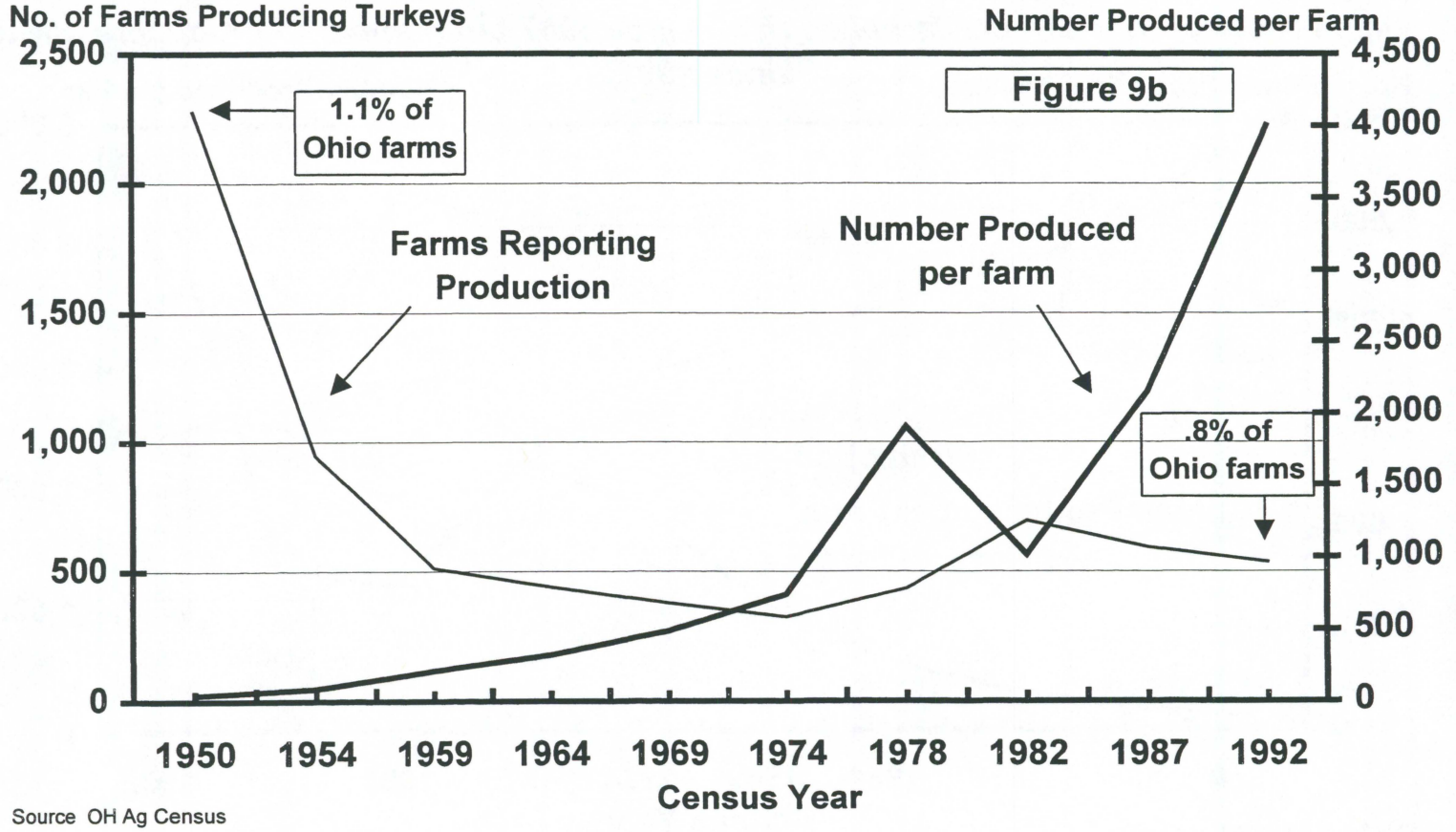
Source OH Ag Census

After generally falling from the early 1950s to 1980, Ohio's share of U.S. turkey production has increased. Production has increased sharply since 1980.



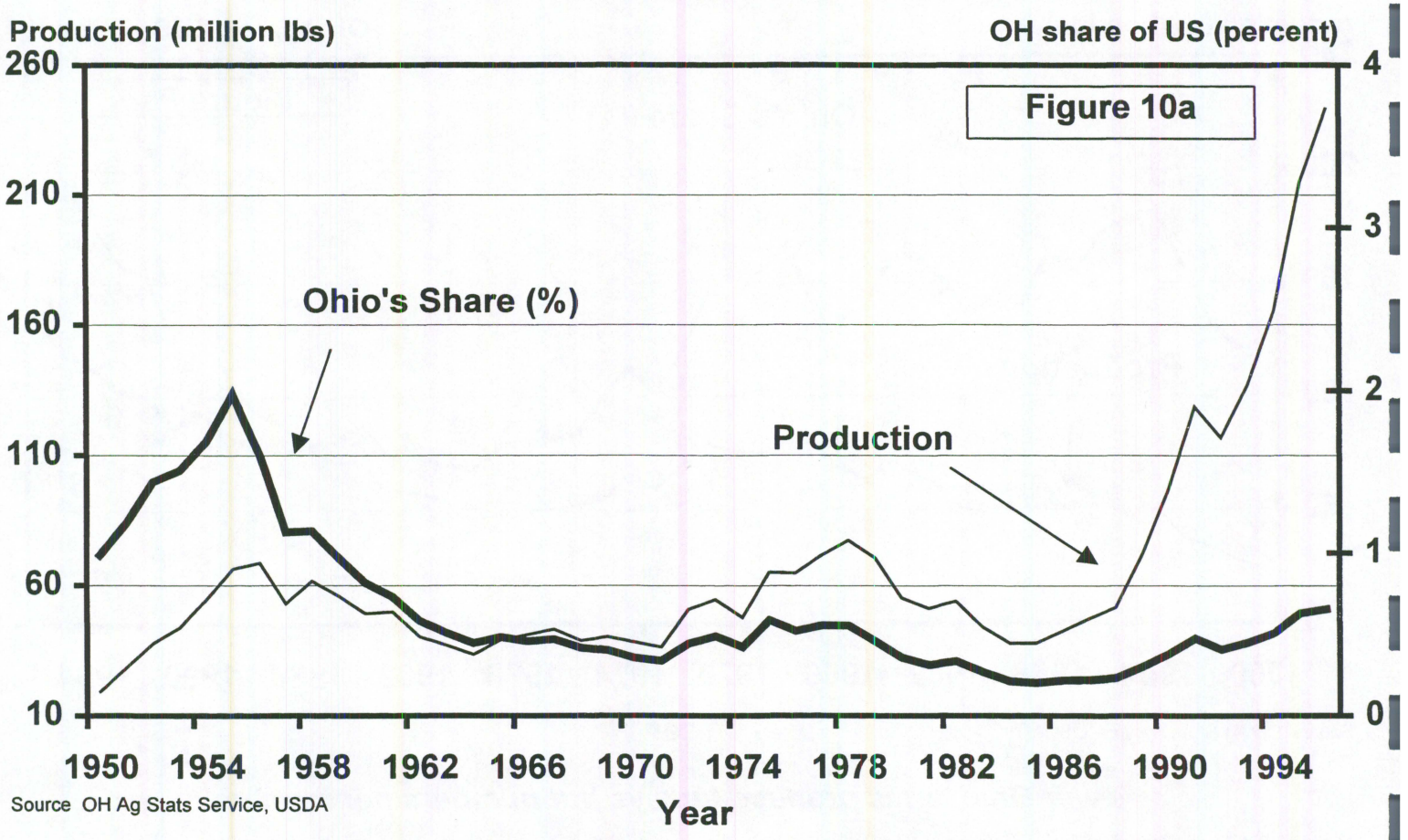
Source OH Ag Stats Service, USDA

Fewer Ohio farms produce turkeys but numbers per farm up.



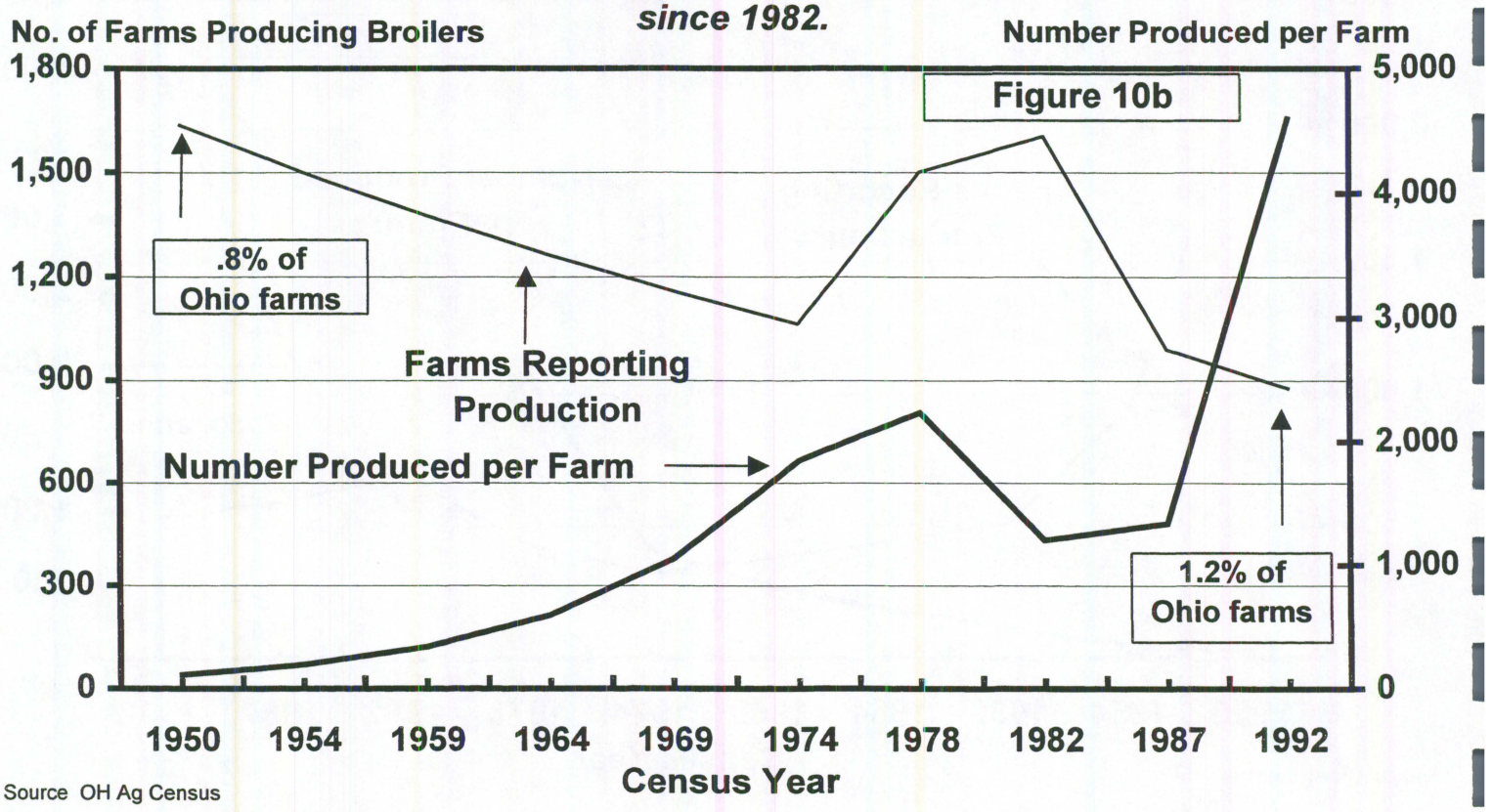
Source OH Ag Census

After a period of modest change from 1950 through the mid-1980s, Ohio's broiler production and share of U.S. production climb sharply.



Source OH Ag Stats Service, USDA

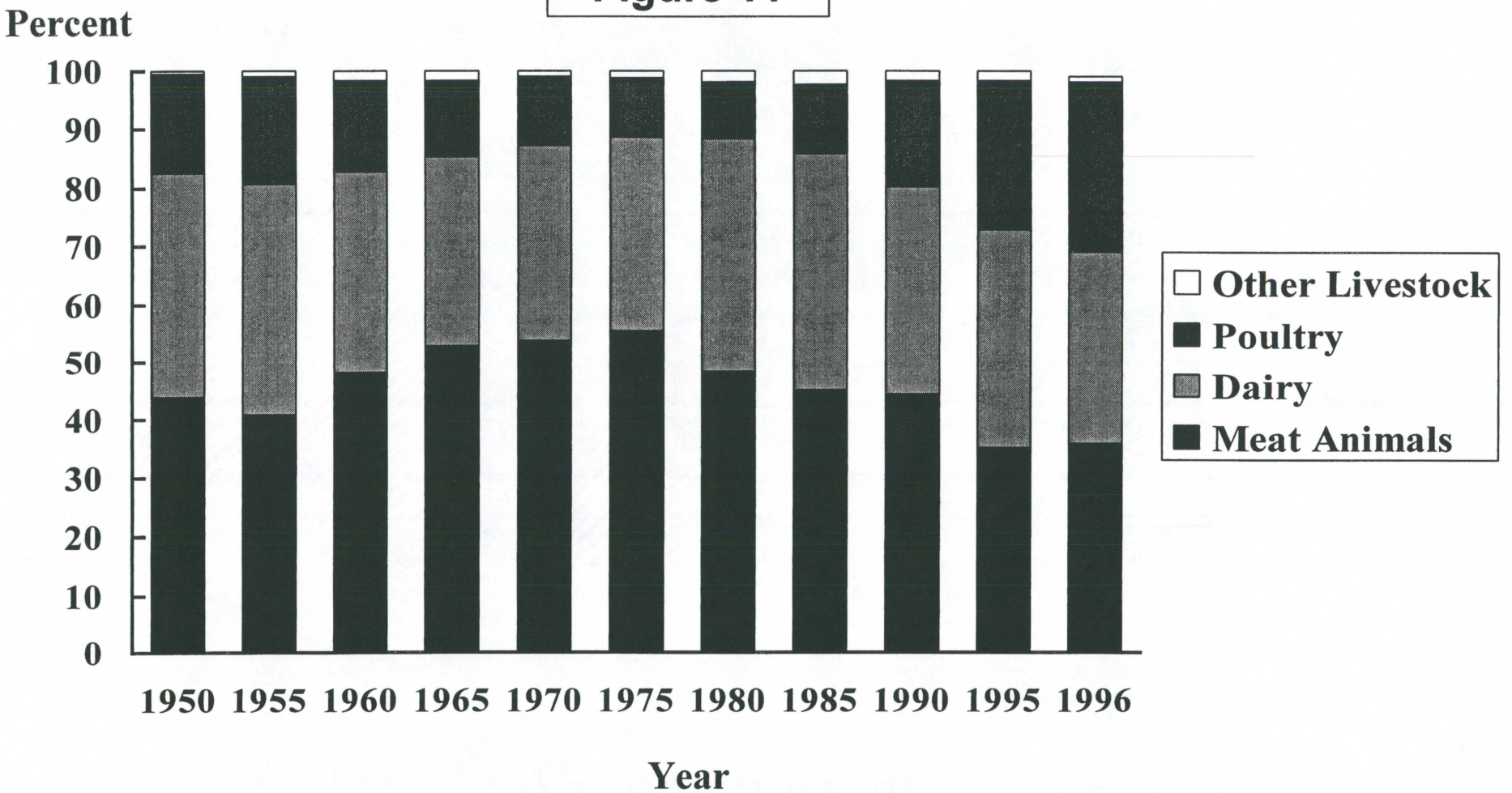
Ohio broiler production per farm has risen since 1987 but number of producers down since 1982.



Source OH Ag Census

Share of Ohio's livestock receipts from poultry up but from meat animals down since 1980.

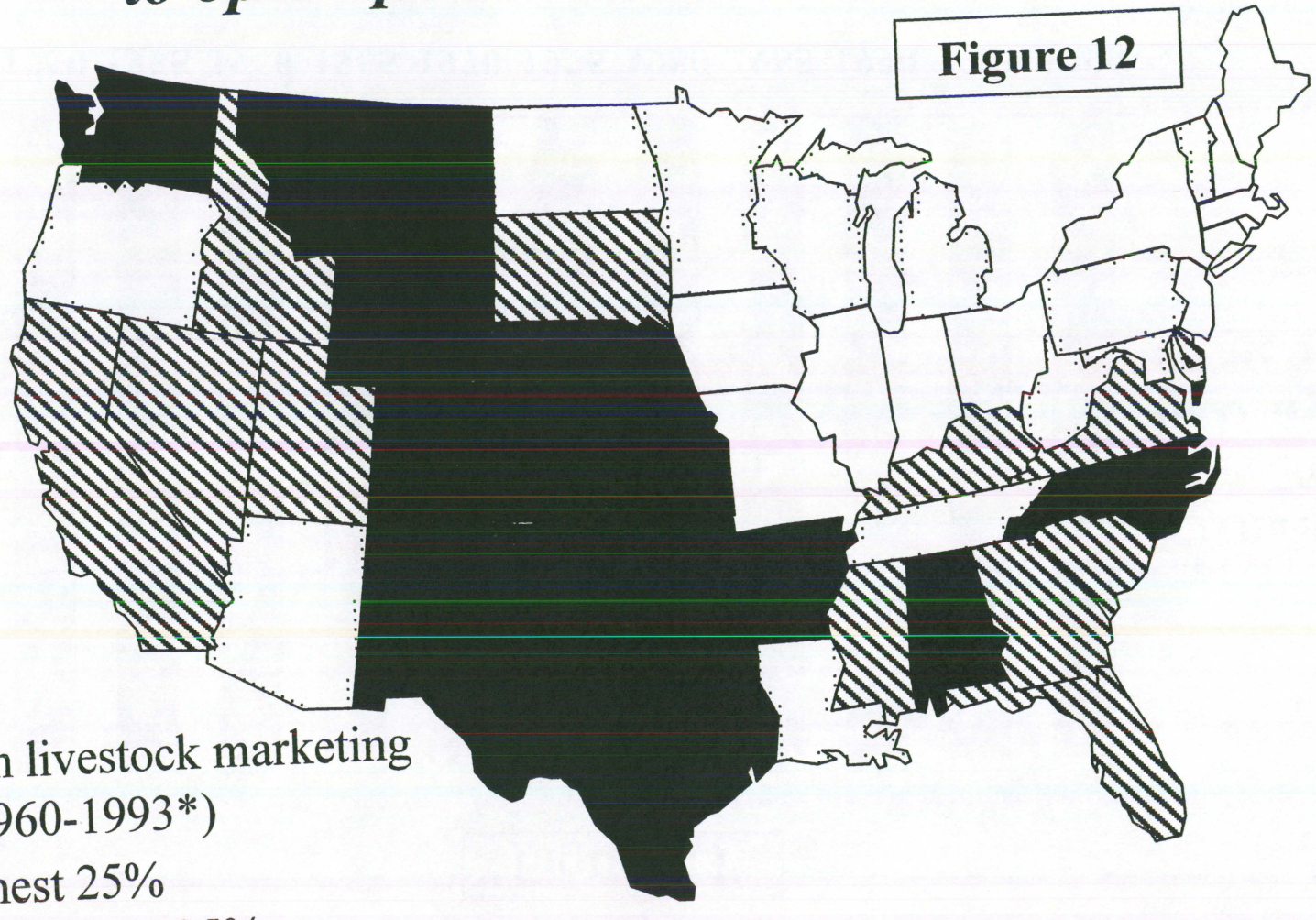
Figure 11



Receipts for Selected Yrs. 1950-95\09.97

Livestock production is moving out of the cornbelt to open spaces and lower labor costs.

Figure 12



(growth in livestock marketing value, 1960-1993*)

- Highest 25%
- Next highest 25%
- Next lowest 25%
- Lowest 25%

* Absolute livestock numbers remain high in the cornbelt.

Source: Basic data from USDA

3. The Changing Structure of Agriculture

Ohio's share of the nation's gross and net farm income fell from 3.3 percent in 1950 to 2.5 percent in 1996.

According to Figures 13, 14, and 15:

- Real output of Ohio's agriculture has fallen modestly since 1950. Real production expenses have fallen less, hence real profit has been squeezed (Figure 13).

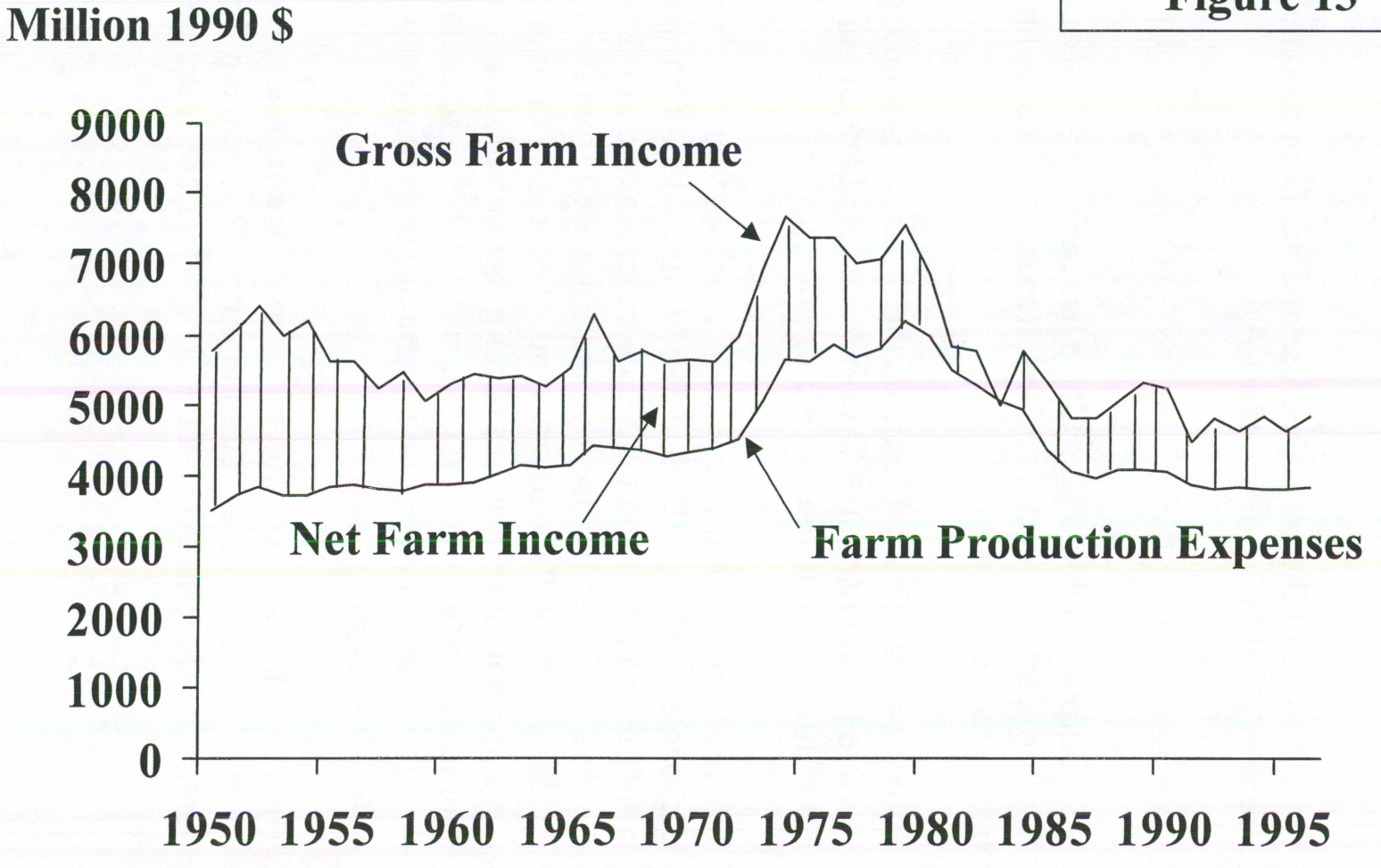
- Figure 14 graphically illustrates the declining absolute (14a) and relative (14b) position of livestock and products in Ohio agriculture, despite the success of poultry.

- The problem is not the *net* loss of cropland which was at the same aggregate level in 1992 as in 1964 (Figure 15). Cropland is being converted to urban and built-up uses as the rate of 0.2%/yr. This conversion is being offset by land converted from permanent pasture and woodland to cropland. The loss of cropland to development and other uses highlights that the state's cropland should not be taken for granted, and will be an important input along with capital, labor, management, and technology in tomorrow's agriculture.

- The most promising option to reverse the downtrend in Ohio's share of the nation's agricultural output is to expand livestock and poultry production in the state. The issues are addressed in section 4.

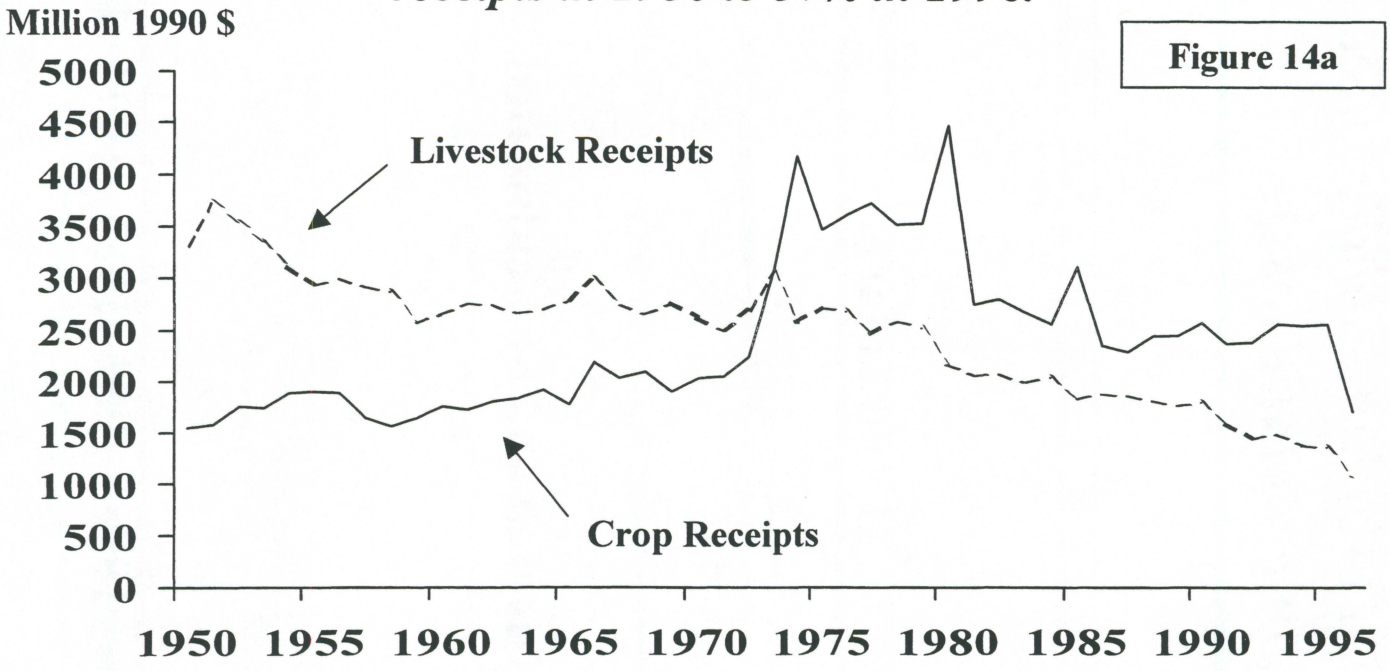
Aside from "bubble" in the 1970s, Ohio's real gross farm income and net farm income decline modestly from 1950 to 1996.

Figure 13



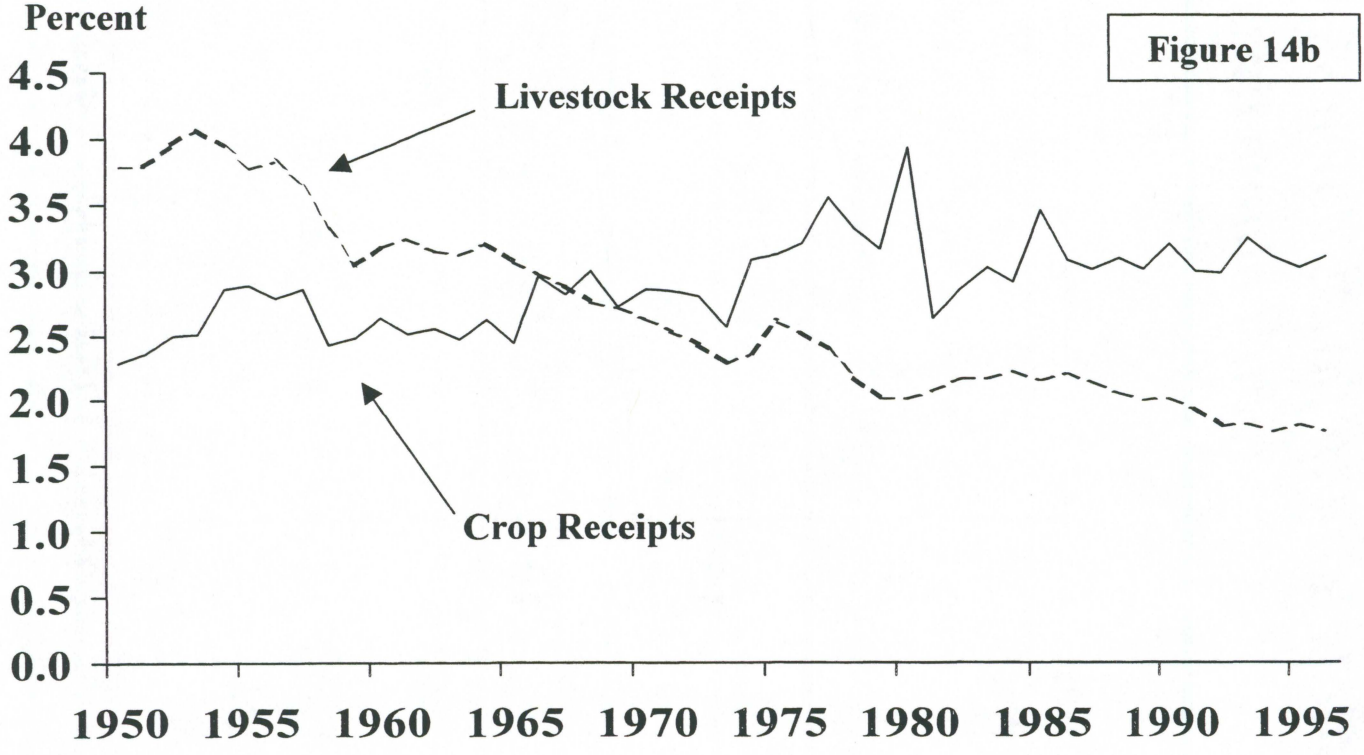
Source: ERS, USDA

Ohio real crop receipts trended up while real livestock receipts trended down from 1950 to 1996. Livestock share fell from 69% of farm receipts in 1950 to 37% in 1996.



Source: ERS, USDA

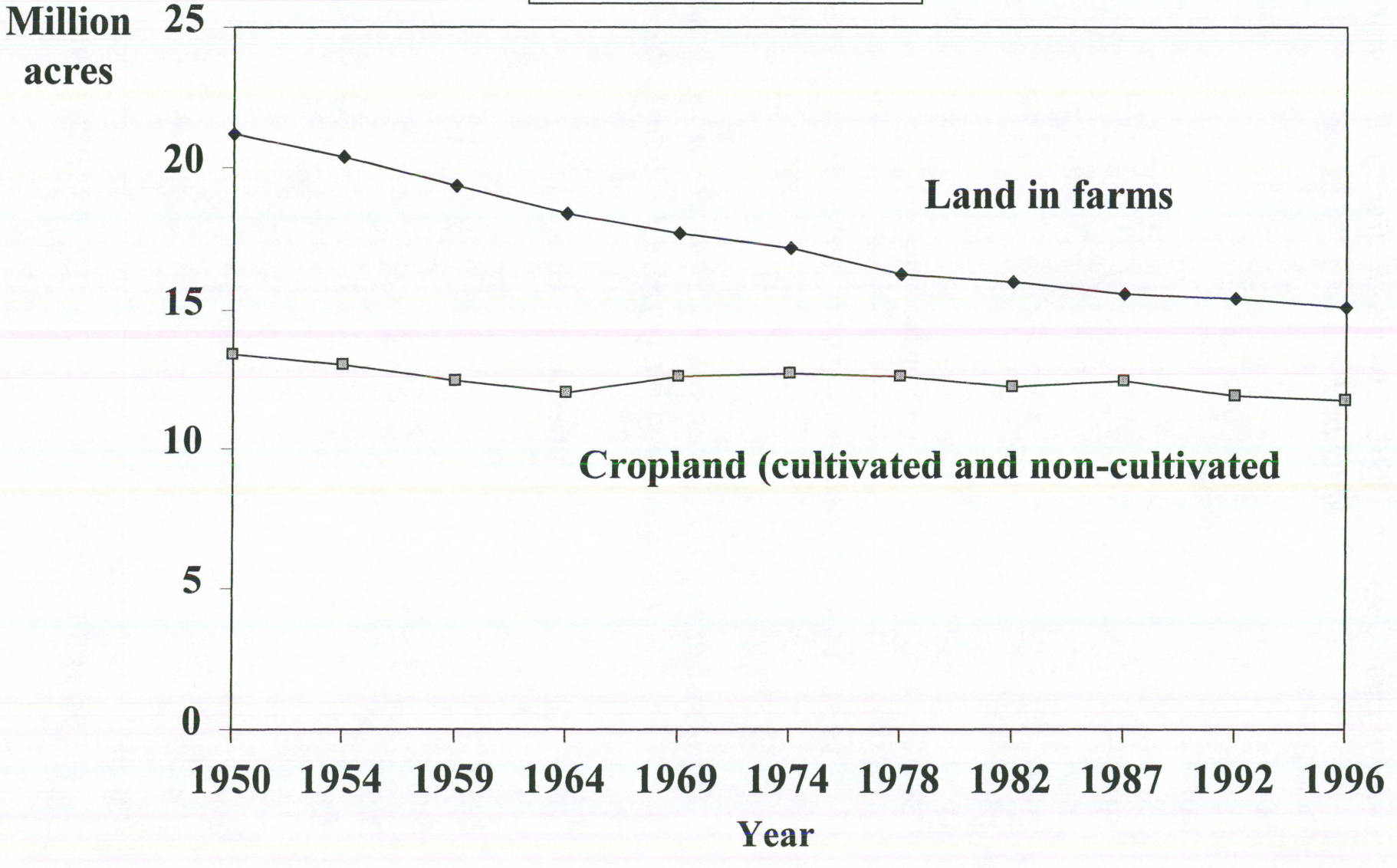
Ohio's share of U.S. livestock receipts down while share of crop receipts up slightly from 1950 to 1996.



Source ERS, USDA

Ohio's land in farms down since 1950 but cropland steady since 1964. (can't blame livestock loss on cropland loss)

Figure 15



4. The Challenge of Expanding the Livestock Industry in Ohio

This section on livestock production strategy for the future emphasizes the swine enterprise because poultry production is doing well in Ohio and swine offers the second best opportunity for value-added expansion in Ohio agriculture. This statement is not intended to rule out other promising enterprises for expansion.

Most everyone has warm feelings toward the typical small, mixed crop–livestock family farm in Ohio that traditionally supplied most of the state's pork. As shown earlier in Figure 6, such operations are declining in numbers. Cost of production, shown by size of swine operations in this section, provides clues to the future direction of efficient production. Two types of estimates of production cost per unit are shown:

- Based on actual operations

- Based on costs that incorporate environmental compliance costs--controlling odor and flies while properly disposing of wastes. Because future agriculture likely will be required to meet stringent environmental standards, these latter estimates are instructive.

Before turning to the cost estimates, some reasons for and against livestock industry expansion in Ohio are reviewed.

Advantages for Livestock Production in Ohio

- *Located in cornbelt surplus feed producing area.* (For example, unit trains of 60 or more railcars of feed are shipped out of Cincinnati to North Carolina.)

- *Located near major markets.* Ohio products can reach 60 million people from Chicago to New York in a day. Ohio is a red meat deficit area--we import more than we export to other states.

- *Major resources are suited to livestock production.* For example, Ohio has more water than the Plains states, less-permeable soils offering manure disposal advantages over more sandy soils found in the coastal plain of North Carolina, and a superb transportation network of rail, road, and water.

- *The state has a tradition of livestock production.* Although Ohio's share of the nation's red meat production has fallen in recent years, it has a tradition of livestock production. In many areas of western Ohio, for example, farmers have the special skills and interests to produce livestock.

- *Provide jobs and income.* The potential contribution of livestock is illustrated by a comparison between Mercer and Van Wert counties bordering each other in western Ohio. Agricultural land is similar in acres and quality. Crop receipts are similar in the two counties. But livestock receipts and total agricultural receipts differ sharply as reported by Schnitkey (*Farm Management Update*, Fall 1997, pp. 2,3):

	Mercer (livestock intensive)	Van Wert
Livestock receipts	$147 million	$ 7 million
Agricultural receipts	$214 million	$ 70 million

  The value-adding livestock industry in Mercer County not only added farm jobs but also added jobs and income in service, financial, processing, retailing, and other sectors.

- *Recycle nutrients.* Producing livestock and poultry in Ohio offers opportunities to recycle nutrients in manure back to crops. Nationally, farms producing livestock increasingly are being

separated from farms producing feed. But return of livestock feeding to the cornbelt from isolated areas of the Plains or Mountain states improves chances to recycle nutrients from livestock waste.

Disadvantages of expanding livestock in Ohio

- Much effort could go into expanding livestock production without success—thwarted by the urban-industrial nature of the state. Several problems are apparent:

  - Rather than raise livestock, many farm operators prefer to raise crops and work off the farm for high and steady wages.

  - Hired labor costs are high for operators who need to supplement family labor and many farmers are not good at managing workers.

  - Land costs are inflated by development potential. Many farmers have insufficient capital remaining to finance a livestock operation after acquiring land and machinery for crops.

  - Urban people and the many nonfarm people residing in rural areas sometimes protest the odors, flies, water quality problems, and slow moving farm vehicles on roads that may attend livestock production.

- *Fewer small family farms*. Livestock traditionally were produced on farms that were full-time family operations though small by today's standards. Each of today's intensive 24,000 head hog operations, 1,000 cow dairy operations, or 150,000 laying hen operations replaces large numbers of family farms like those the authors grew up on raising 30 sows, 6-14 dairy cows, and 300 laying hens.

  The Center for Rural Affairs in Nebraska recently published a report showing greater economic and social activity in a community surrounded by a number of small family farms rather one surrounded

by a few large corporate farms. Other things equal, most Ohioans probably would prefer communities surrounded by small family farms rather than by large concentrated animal feeding operations (CAFOs). The issue is complex, however:

- Large livestock farms on average produce animals and animal products at lower cost per unit than do small family farms. Lower costs at the farm level are passed on to consumers, especially benefiting low-income families who spend a high proportion of their income on food.

- Small farms typically must derive a high proportion of their income from off-farm sources because most lose money farming. Many rural communities do not offer many off-farm jobs. For that reason many small farmers live in poverty--a condition especially apparent in Appalachia, the Mississippi Delta, the Black Belt of Alabama, Indian Reservations, and the Ozarks.

Attention in this report now turns to economies of size which plays a big role in the type of livestock operations that will survive and expand in the state.

Cost of Swine Production by size of farm

The most comprehensive data on actual performance of hog operations by size are from the extensive Farm Costs and Returns Survey conducted by the U.S. Department of Agriculture. Figure 16, based on actual 1990 performance, shows costs per hundredweight of hogs marketed falling from $60 for small operations to $43 for large operations. And even the largest operation shown, 10,000 head per farm, is much smaller than many swine operations today. Hence, economies may extend beyond those shown in Figure 16.

Results are shown in Figure 17 for farrow-to-finish operations in 20 states based on the Farm Costs and Returns Survey in 1992. As numbers of hogs fed increase, hours of labor per hundredweight of gain fall 70 percent and feeding efficiency rises 26 percent (Figures 17a and 17b). Most of these economies are achieved by a 1000 head operation.

A key factor affecting production cost is managerial ability of the operators. Thus, size effects and managerial effects can be compounded in the data presented above. Figure 18 shows costs per hundredweight of hogs in the Midwest falling from $43 to $35.38 between small and large units, or by 18 percent.

The final Figures (19a and 19b) show costs of swine production using the most advanced environmental and other technology. Public opposition is strong to swine operations which do not properly control for odor and flies or do not properly dispose of wastes. At issue is whether large operations will continue to produce at lower costs per unit of output than smaller operations while taking appropriate care of the environment.

Figure 19 derived from numbers supplied by Thomas Menke, a swine environmental consultant, show economies in building and labor for a facility designed to minimize odor and flies while storing swine manure for disposal onto farm fields. Only labor and building economies are shown. Eight finishing buildings constitute a full-time operation, requiring 8 hours per day of labor. Smaller operations are part-time.

Manure injection costs are not included. Such costs rise per hog as a greater volume of manure requires traveling farther to fields so that manure is spread at rates posing no problem for ground or surface water quality. However, the Menke technology features removal of water from waste. The remaining solid waste is easy to transport at low cost with minimal environmental problems. Furthermore, any increase in cost per pig for manure disposal might be offset by economies of larger

operations: lower feed and hog hauling costs per pig and by lower equipment and operational management cost per pig.

We do not know the behavior of the cost curves in Figure 19 for operations smaller than 500 pigs per building or less than one 1,000 pig building per operation. Ohio swine budgets compiled by Gary Schnitkey indicate that smaller operations could have lower building costs if they are not required to meet environmental regulations assumed for the larger farms in Figure 19. However, if all farmers were required to meet the stringent environmental standards assumed in Figure 19, small farms probably would have higher costs than large farms.

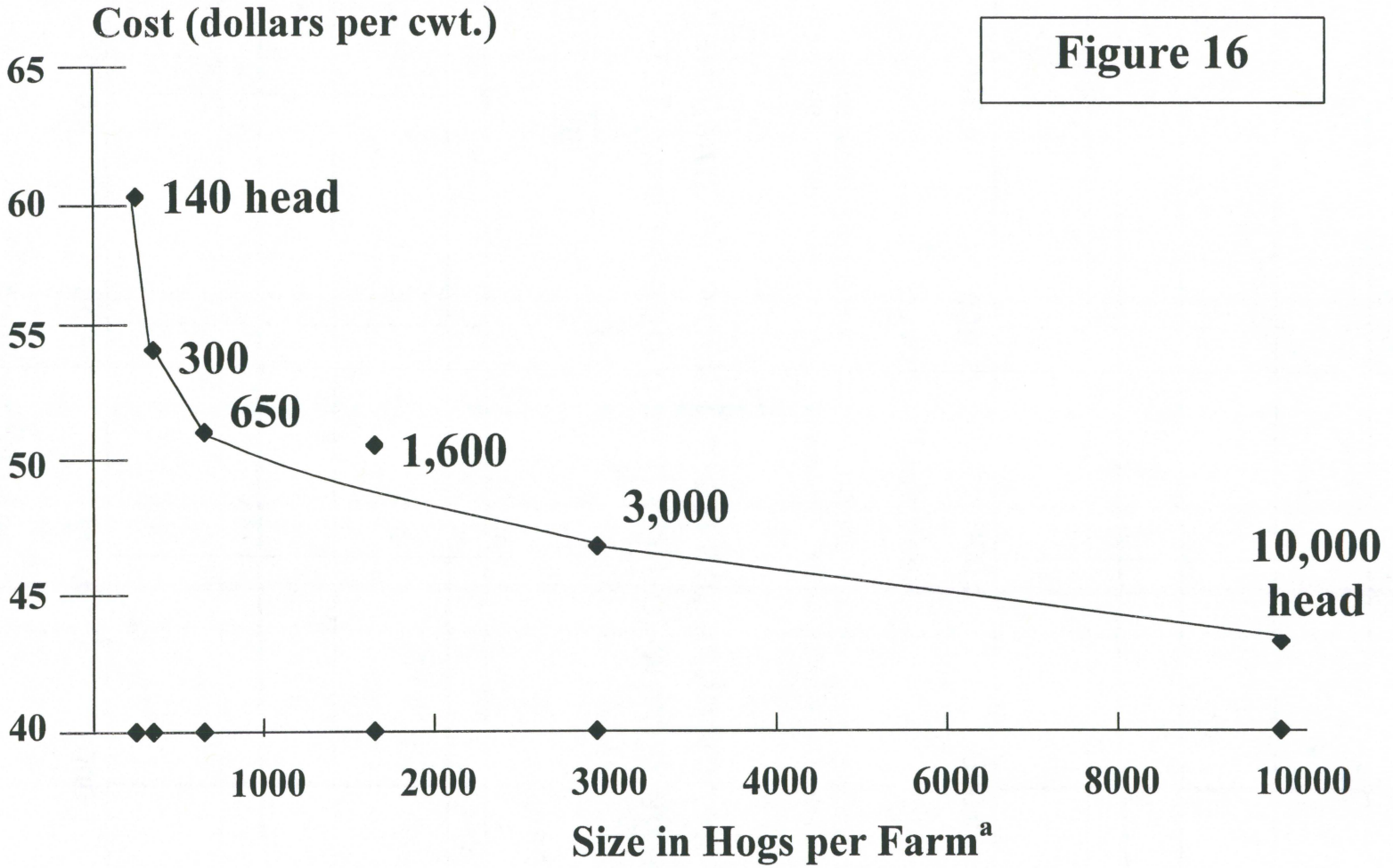
Thus evidence to date points to lower unit production costs on large swine operations than on small swine operations, even with proper attention to the environment. Of course, a well-managed smaller operation can produce a hog for less than can a poorly managed large operation. But that is not usually the situation--larger operations typically have better management because financial rewards are greater.

In summary, local small family livestock farms find it difficult to compete economically with concentrated animal feeding operations (CAFOs). The number of small family farms producing significant quantities of livestock and livestock products is falling rapidly. Thus the choice facing rural communities is usually not whether to have small family livestock farms or CAFOs. Rather, the choice facing rural communities often is whether to have CAFOs or no livestock farms.

CAFOs displace small family livestock operations, but that trend will continue in Ohio whether or not Ohio allows large livestock operations. Family farms producing under contract arrangements can reduce their capital requirements, risk, organizational management, and marketing challenge. Family farms that contract to produce livestock, can supplement crop income and have smaller acreages in each farm. Thus contracting can help to preserve Ohio's family farms.

U.S. hog production costs averaging 30% lower on larger farms in 1990 encourage size expansion.

Figure 16



Source: U.S. Department of Agriculture, *Cost of Production--Livestock and Dairy*, Washington, DC: Economic Research Service, USDA, 1990.

[a]Farms range from "stand alone" sole proprietorships to integrated operations.

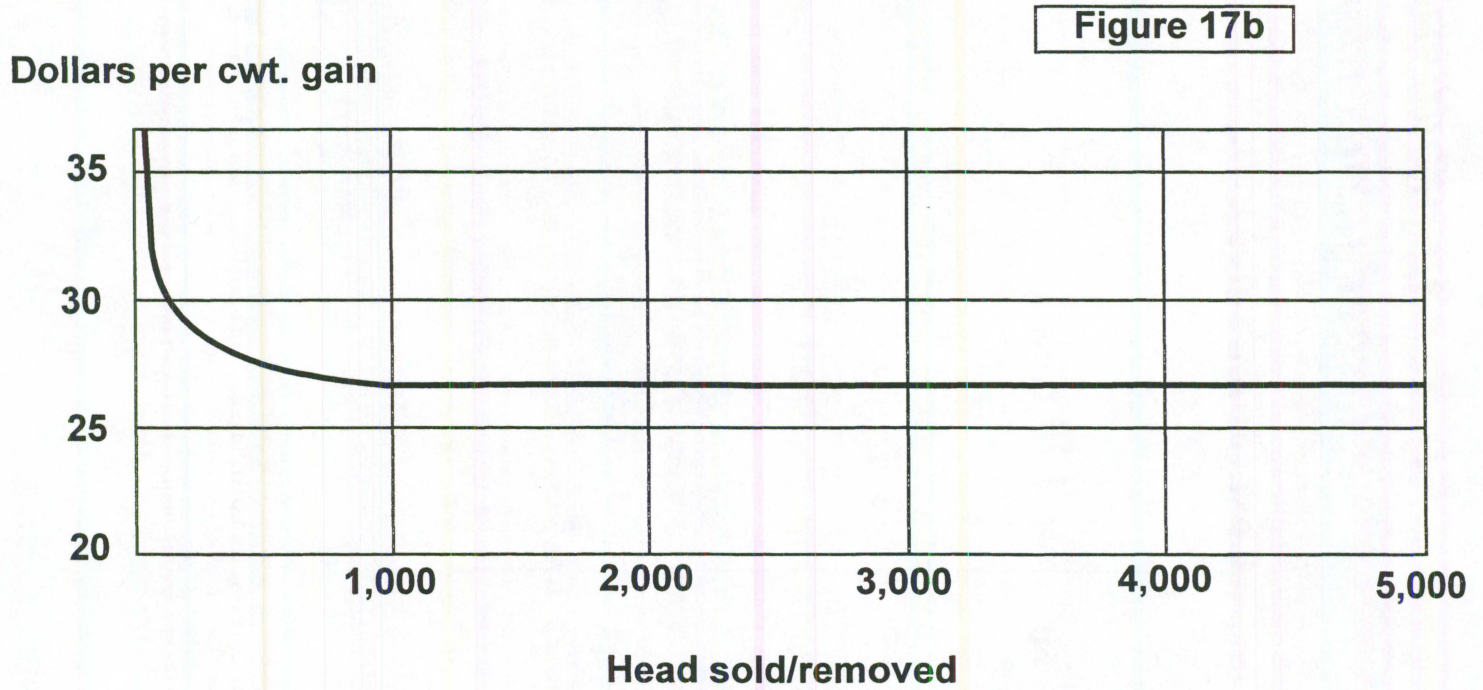
Labor efficiency falls from 4 hrs/cwt in small herds to under 1.5 hrs/cwt in herds with over 5,000 pigs in farrow-to-finish hog operations, U.S., 1992.

Figure 17a

Source William McBride *U S Hog Production Costs and Returns,1992 And Economic Base Book* Agricultural Economic Report No 724 Washington DC Economic Research Service, USDA, 1995, p 19

Feeding efficiency changes from $35/cwt in small herds to $26/cwt in large farrow-to-finish hog operations, U.S., 1992.

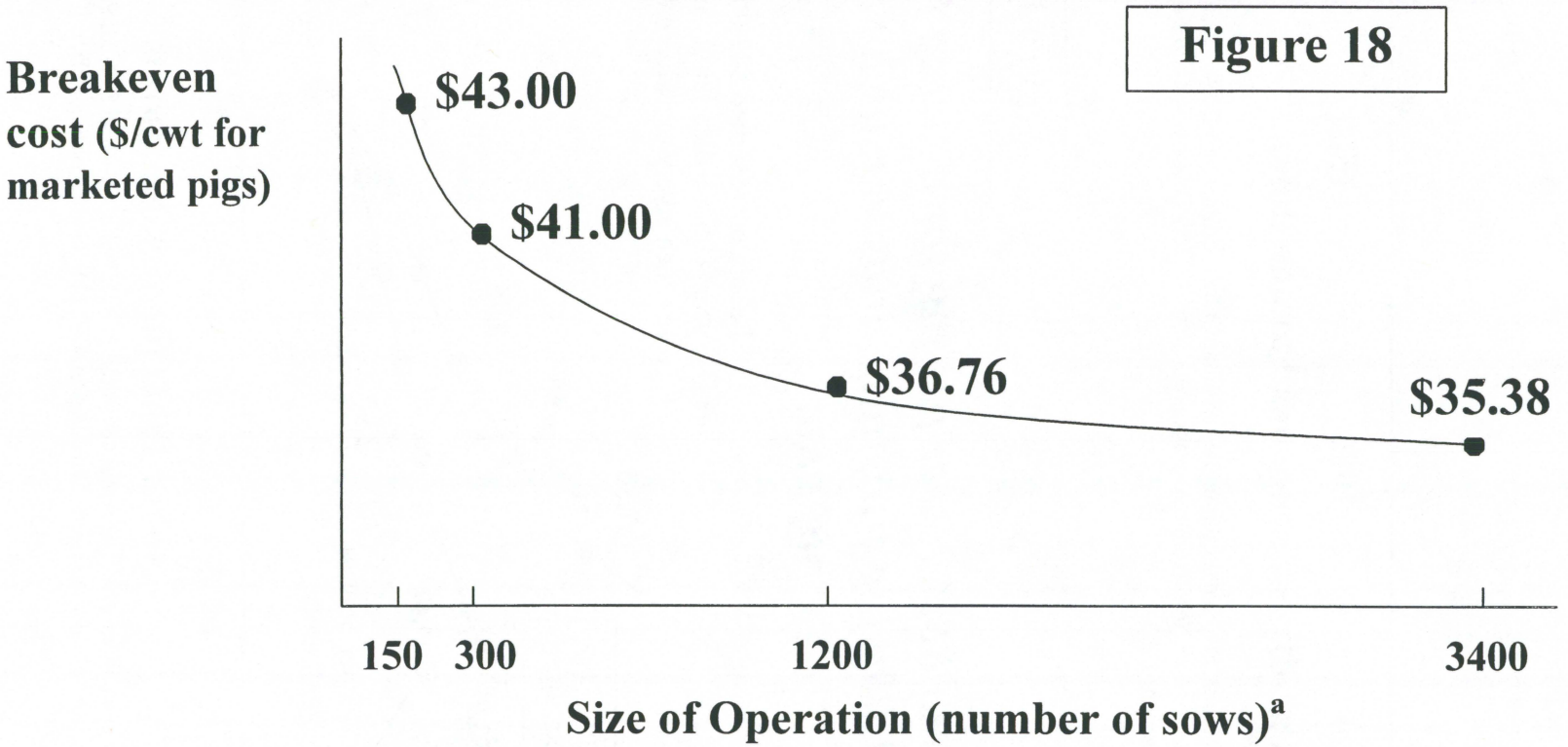
Figure 17b



Source see McBride, Figure 17a

Breakeven total costs/cwt for a 3400-sow farrow-to-finish operation is 18% below costs for a 150-sow operation in Midwest.

Figure 18



Source: Adapted from Daniel Otto, John Lawrence, and Dave Swenson, *Local Economic Impacts of Hog Production.* Iowa State University, Ames, 1996; and Kenneth Foster, Chris Hurt, and Jeffrey Dale, *Positioning Your Pork Operation for the 21st Century*, Department of Agricultural Economics, Purdue University, 1995.

[a]Presumes modern, state-of-the-arts hog production facility for 150, 300, 1,200, and 3,400 sows producing annual marketings of 2,851, 6,451, 28,853, and 75,072 finished hogs respectively.

Annualized costs for deep-pit swine finishing facility are 18 percent lower for 2,000 head building versus 500 head building.

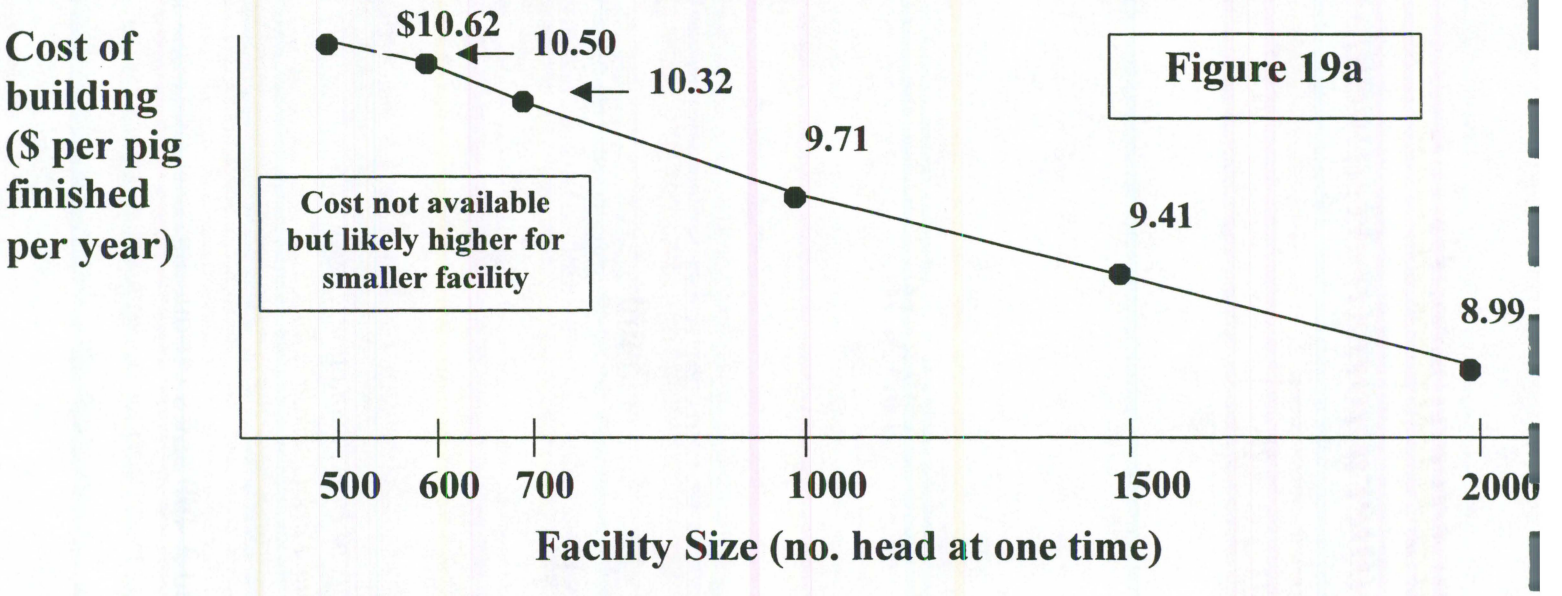
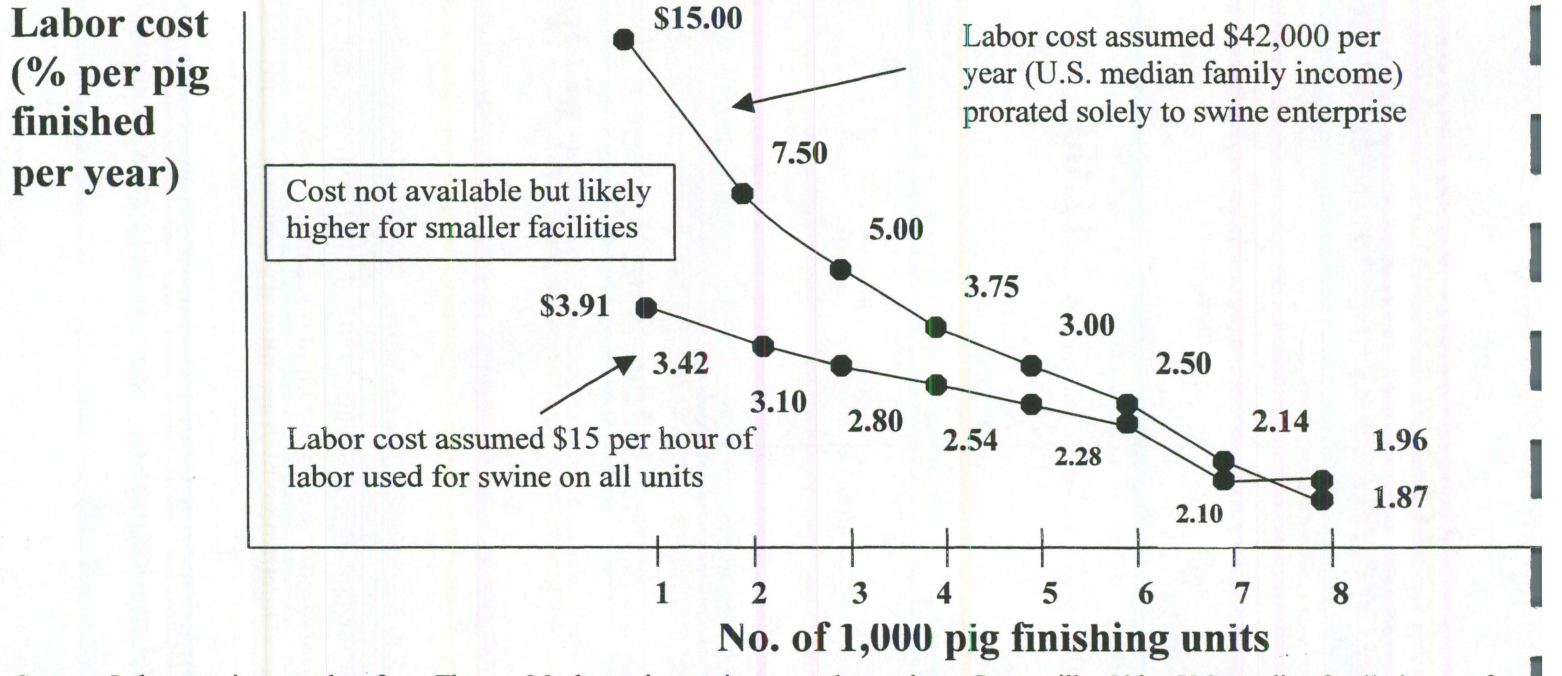


Figure 19a

Source Building capital cost data from Thomas Menke, swine environmental consultant, Greensville, Ohio, 1998 Includes 17% charge for depreciation (10 0%), interest (4 5%), repairs (1 7%), taxes (0 5%), and insurance (0 3%) from Gary Schnitkey, *Ohio Farm Enterprise Budge 1993*, Columbus, OH Ohio State University Extension, 1993

Figure 19b

Labor cost are 50% to 88% lower per pig for a swine finishing operation with eight 1,000 pig finishing units versus a single 1,000 pig unit.



Source Labor requirement data from Thomas Menke, swine environmental consultant, Greensville, Ohio U S median family income from U S Council of Economic Advisors, *Economic Report of the President* Washington, DC U S Govt Printing Office, 1998

5. Strategy for Swine Industry Expansion in Ohio

With the above background, the following outline summarizes some considerations for swine industry expansion in Ohio.

1. Assumptions

- Ohio has the inputs (feed) and the markets
- Probably traditional family farms will not expand
- A major packing plant is useful, but not decisive (Livestock numbers probably must be assured before a major packer will locate in the state.)
- Most likely expansion will be hogs and/or poultry. Dairy has potential also.
- Some decentralization of production important to avoid overloading environment

2. Need proper regulatory environment

- Stable, predictable, fair
- Swine operations need to "keep their house in order." Carelessness by a few operations can create a public relations backlash harmful to all agricultural producers. Use of setbacks, keeping neighbors informed, dialogue, and adherence to regulations make good business sense.

3. Locations

- Away from urban areas or heavily populated rural nonfarm areas

- Best where people accustomed to livestock (manure smells like money, not waste)

- Candidates (Avoid urban areas)
  ⇨ Western Ohio from Greenville to Bryan (Lots of feed, a tradition of husbandry in some counties)

  ⇨ Amish area (A tradition of husbandry, desire for livestock expansion)

  ⇨ Southern Ohio especially east of state highway 62 (Surplus feed, some counties not near urban centers)

4. Entrepreneurs

- Need to know they are welcomed and appreciated

- Recognize they can originate from traditional family farms, from current growers, from non-farmers, from in- or out-of-state, etc.

5. Research (must have strong scientific and technical backup)

- Production and market efficiency

- Disease control

- Waste disposal

- Odor control

- Fly control

- Crop as well as livestock research to assure low cost feed